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A review of important forest insect and disease problems in the KENORA DISTRICT of Ontario, 1950-1980

Compiled by

M. J. Thomson, L. S. MacLeod, H. J. Evans,
D. C. Constable and C. G. Jones

Miscellaneous Report No. 63

Canada

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A REVIEW OF IMPORTANT FOREST INSECT AND DISEASE PROBLEMS IN THE KENORA DISTRICT OF ONTARIO, 1950-1980

Compiled by

M.J. Thomson, L.S. MacLeod, H.J. Evans, D.C. Constable and C.G. Jones[1]

GREAT LAKES FORESTRY CENTRE
CANADIAN FORESTRY SERVICE
GOVERNMENT OF CANADA
1988

MISCELLANEOUS REPORT NO. 63

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[1] *Forest Research Technicians, Forest Insect and Disease Survey Unit*

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FOREWORD

The first forest insect surveys in Ontario were carried out in 1936 from the Dominion Entomological Laboratory in Ottawa and continued from this location until 1944, when the province of Ontario was divided, for the purpose of these surveys, into northern and southern Ontario. In 1945, personnel from Ottawa continued to conduct and report on surveys in the area south of the Algonquin Park and Parry Sound forest districts, while personnel from the Forest Insect Laboratory in Sault Ste. Marie carried out surveys in the area to the north. In 1950 responsibility for reporting insects for all of Ontario fell to the Sault Ste. Marie laboratory. In 1952 the Forest Disease Survey was initiated with headquarters in Maple, Ontario, then was moved to Sault Ste. Marie in 1967. The results of these surveys of insects and diseases are reported in the Annual Report of the Forest Insect and Disease Survey (FIDS) published by Canadian Forestry Service headquarters in Ottawa. In addition, annual district and regional reports, begun in 1948, are prepared by FIDS technicians (Rangers) in Sault Ste. Marie. In 1980 a new provincial report was released in Ontario. The contents of the following review have been abstracted from these reports and compiled in alphabetical order by the scientific names of species in each of the following three categories:

Major Insects or Diseases

Capable of causing serious injury to or death of living trees or shrubs.

Minor Insects or Diseases

Capable of causing sporadic or localized injury but not usually a serious threat to living trees or shrubs.

Abiotic Damage

Damage caused by non-living factors.

All measurements in this review are in metric form and conversions from Imperial measurements given in the earliest reports are taken to the second decimal point [i.e. sq. mi. to km^2 = area (sq. mi.) x 2.59 = area km^2]. Infestation maps in this review were copied from the original maps in the FIDS technicians' reports. Abbreviations for the common names of the host tree species, along with the scientific names, are shown in Appendices A and B. To facilitate the location of hosts, deciduous and coniferous species have been separated and listed alphabetically under the common names.

Appendix C is a series of maps for northwestern Ontario grouped alphabetically by insect species or disease pathogen and showing the location of infestations within a region or infestation boundaries that extend beyond regions.

ACKNOWLEDGMENTS

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We also wish to acknowledge the following authors of the FIDS district and regional reports from which this review was abstracted:

1950-1954	W.J. Miller
1955	P.E. Buchan
1956-1959	D. Bowen
1960	P.E. Buchan
1961-1965	G.G. Jackson
1966	P.E. Buchan
1967-1969	J. Mason
1970-1971	M.J. Thomson, C.A. Barnes and C.N. Davis
1972-1973	M.J. Thomson, C.A. Barnes and M.J. Applejohn
1974-1975	M.J. Thomson and E.L. Houser
1976-1979	M.J. Thomson and R.J. Sajan
1980	M.J. Thomson and V. Jansons

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INTRODUCTION

This is a review of significant forest insects and diseases recorded from 1950 to 1980 in the area currently covered by the Kenora District. This district underwent a significant boundary change in 1973 when a large portion of the former district became part of the Dryden and Fort Frances districts and a small portion of the former Sioux Lookout District was added. In the selection of pests for this report, particular attention was paid to the major working groups of host species in the area, namely, jack pine, white pine, red pine, white spruce, black spruce balsam fir, larch and the tolerant hardwoods (poplar and white birch) as well as some ornamentals and shade trees. The insects and diseases included are capable of causing, or have caused, tree mortality or a reduction in growth. Also included are abiotic problems that cause damage, i.e., drought, frost, wind and winter drying.

SUMMARY

FOREST INSECTS

Eastern Blackheaded Budworm, *Acleris variana* (Fern.) [Major]
page 9

No tree mortality has been recorded as caused by this defoliator, which affects primarily spruce, balsam fir and eastern hemlock. Although the insect is widely distributed throughout the district, only low numbers or trace populations have been found, except in 1964, when a light infestation was recorded at one point.

Birch Skeletonizer, *Bucculatrix canadensisella* Cham. [Major]
page 9

Defoliation by this insect seldom causes mortality of the host but weakened trees are subject to attack by secondary insects and diseases. Large outbreaks of this insect usually last 3 to 4 years, then decline rapidly. Medium-to-heavy infestations were recorded in 1956 and from 1970 to 1973.

Large Aspen Tortrix, *Choristoneura conflictana* (Wlk.) [Major]
page 11

No tree mortality has been recorded as caused by this defoliator, which affects primarily aspen and poplar. A light infestation occurred in 1970 and moderate-to-severe damage was recorded in 1971. Trace populations were reported in 1964, 1973 and 1974.

Spruce Budworm, *Choristoneura fumiferana* (Clem.) [Major]
pages 13-14

This insect is considered the most destructive insect pest of several coniferous hosts in eastern Canada; the main hosts are white spruce and balsam fir. Though not major hosts, black spruce, eastern hemlock and tamarack are attacked and considerable tree mortality can occur. Moderate-to-heavy infestations occurred from 1950 to 1958, and again in 1980. Tree mortality was recorded in 1951 and the area affected increased until 1958, at which time budworm-killed trees could be found in many stands throughout the district.

Jack Pine Budworm, *Choristoneura pinus pinus* Free. [Major]
page 28

This is a destructive pest of pines that can cause mortality after about two years of severe defoliation. Medium-to-heavy infestations were recorded in 1954, 1961 and 1962, and from 1964 to 1968. Small numbers were observed in 1950, 1955, 1969, 1974, 1979 and 1980.

Aspen Twoleaf Tier, *Enargia decolor* (Wlk.) [Major]
page 34

No tree mortality has been recorded as caused by this defoliator, which affects aspen and cottonwood; however, heavy defoliation reduces growth and vigor and leaves host trees susceptible to attack by other pests. Outbreaks of this insect last only a few years. Pockets of moderate-to-severe defoliation, intermingled with pockets of light defoliation, occurred in 1959 and high populations were recorded in 1969. Light damage was evident in 1960, 1962 and 1970.

Eastern Pine Shoot Borer, *Eucosma gloriola* Heinr.
pages 34-35

This insect usually infests lateral shoots and causes only aesthetic damage. When high populations develop, some leaders are infested and killed, and this causes deformity of the infested trees. Moderate-to-severe leader damage occurred in 1964 and 1965. Light infestations were recorded in 1959, 1960, 1979 and 1980.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn. [Major]
pages 35-36

This caterpillar is widely distributed through North America. Infestations usually last an average of five years and high populations denude large areas of susceptible stands. The principal host attacked is aspen; however, many other deciduous species also suffer severe defoliation. Repeated defoliation reduces growth and vigor of trees and leaves the host susceptible to attack by other pests. High populations occurred in parts of the district from 1950 to 1953, from 1961 to 1965 and from 1975 to 1979.

Balsam Fir Sawfly, *Neodiprion abietis* complex [Major]
pages 52-53

Severe defoliation caused by this sawfly can result in mortality of balsam fir and white spruce trees when an infestation persists over a period of time. Medium-to-heavy infestations occurred in 1956, 1961, 1966 and 1967. Pockets of light infestation or trace populations were recorded occasionally as well.

Pine Sawflies: Red Pine Sawfly, *Neodiprion nanulus nanulus* Schedl.,
Jack Pine Sawfly, *Neodiprion pratti banksianae* Roh.,
Swaine Jack Pine Sawfly, *Neodiprion swainei* Midd.,
and Redheaded Jack Pine Sawfly, *Neodiprion virginianus* complex [Major]
pages 53-56

The sawflies listed are capable of causing mortality of semimature and plantation pine trees when populations are high. Although small pockets of medium-to-heavy infestation were observed occasionally, there is no record of mortality from 1960 to 1980.

Aspen Leafblotch Miner, *Phyllonorycter ontario* (Free.) [Major]
pages 56-57

Although this insect has not been known to cause tree mortality, severe browning of foliage over a period of years can cause a reduction in growth. High populations were present in aspen regeneration stands from 1950 to 1952, from 1961 to 1963, and in 1966, 1969, 1972 and 1980.

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.) [Major]
pages 58-59

This destructive insect has been categorized as a serious pest of young spruce plantations and open-growing ornamentals. High mortality can occur after successive years of severe defoliation. High numbers were reported at scattered points from 1955 to 1959, from 1961 to 1963, in 1966 and 1967 and from 1977 to 1980.

White Pine Weevil, *Pissodes strobi* (Peck) [Major]
page 60

This weevil is considered to be the most destructive pest of white pine in North America. Successive weeviling over a period of years results in multiple-stemmed trees. Varying degrees of damage occurred most years from 1954 to 1980.

Larch Sawfly, *Pristiphora erichsonii* (Htg.) [Major]
pages 60-62

The larch sawfly is the primary defoliating insect of native and most exotic species of larch. On good sites, larch trees can withstand six to nine years of severe defoliation before mortality occurs; on less favorable sites, mortality may follow three or more years of complete defoliation. High populations caused moderate-to-severe defoliation in larch stands at many points from 1950 to 1953, from 1955 to 1959, from 1964 to 1967, and in 1970 and 1971. There was no evidence of tree mortality.

Other Noteworthy Insects [Major and Minor]
page 62

Insects that have the potential for causing damage to stands, regeneration and plantations.

FOREST DISEASES

Armillaria Root Rot, *Armillaria mellea* (Vahl:Fr.) Kummer [Major]
page 71

This root rot disease oftern kills trees previously stressed by drought, insects, other pathogens or unfavorable environment. However, under some circumstances the fungus, or certain strains of the fungus, can kill vigorous trees. Both deciduous and coniferous trees are attacked. Only trace mortality caused by the pathogen could be found from 1950 to 1980 even though extensive surveys were carried out over several years.

Dutch Elm Disease, *Ceratocystis ulmi* (Buism.) C. Moreau [Major]
page 71

This major disease organism, which affects all species of elm, was first recorded in Ontario in Prescott County in 1946, and has gradually spread throughout most of the known range of elm in Ontario. The disease was recorded for the first time in the district in 1980.

Needle Rusts, *Chrysomyxa ledi* (Alb. & Schwein) de Bary [Major]
C. ledicola (Peck) Lagerh.
page 72

These, the most widely spread rusts in the Canadian boreal forest, are of concern on mature trees, but the potential for damage in nurseries can be high as well. Varying levels of infection were reported in most years, with the exception of 1952, 1953, 1956, 1958, 1961, 1969 and 1971.

Ink Spot, *Ciborinia whetzelii* (Seaver) Seaver [Major]
page 73

This ink spot disease is widespread throughout the range of aspen. Many poplar species and hybrids are susceptible, but trembling aspen is most commonly affected. Heavily infected trees may be defoliated prematurely and repeated attacks can reduce increment and even kill regeneration. Medium-to-heavy foliar damage occurred in 1962. In other years when the disease was reported only trace or low levels of infection were evident.

Rusts of Pine: Needle Rust of Pine, *Coleosporium asterum* [Major]
(Dietel) Sydow, *Cronartium quercuum* (Berk.)
Miyabe ex Shirai f.sp. *banksianae*, and
Western Gall Rust, *Endocronartium harknessii*
(J.P. Moore) Y. Hirats.
pages 73-75

These rusts may kill trees outright or make them more susceptible to insects, decay and wind breakage depending on he degree of infection. The western gall rusts on jack pine are widely distributed in the district. High levels of infection were reported in 1974 and 1979. Medium-to-heavy infection by *Coleosporium asterum* was reported in 1966.

White Pine Blister Rust, *Cronartium ribicola* J.C. Fischer [Major]
page 76

White pine blister rust is the most serious disease of eastern white pine. The disease causes top killing and mortality in trees of all ages. The pathogen is present throughout the range of the host in the district. A high incidence of infection was recorded in 1958, 1960 and 1974.

Needle Cast, *Davisomycella ampla* (Davis) Darker [Major]
pages

This pathogen causes severe defoliation when incidence is high. In years of severe defoliation, trees are weakened and growth reduced. Infection can be so severe that all but the current year's foliage may be cast off. Moderte-to-severe needle cast occurred at one point in the district in 1966 and in many stands in 1972.

Hypoxylon Canker, *Hypoxylon mammatum* (Wahlenb.) J. Miller [Major]
page 77

Mortality caused by this desease is usually restricted to trees in the 7-cm to 13-cm diameter class, growing on poor sites, but branch and top mortality may occur in trees of greater diameter. Varying degrees of infection by the pathogen can be found in immature trembling aspen stands throughout the district.

Shoot Blight, *Sirococcus conigenus* (DC.) P. Cannon & Minter [Major]
page 78

This pathogen is capable of killing trees outright in many age classes and is especially serious in young understory regeneration. The principal host is red pine, although other pines are susceptible to attack. Damage caused by the disease was first recorded in the district in 1973. New areas of infection were reported in 1974, 1976 and 1978.

Shoot Blight, *Venturia macularis* (Fr.) E. Müller & v. Arx [Major]
page 80

Reduced stocking of aspen regeneration occurs when the incidence of this disease is high. Trees more than five years old are seldom affected and, therefore, the disease is of little economic importance in natural stands. When leaders are attacked the pathogen causes reduced height growth and deformed trees. Repeated attack on leaders and lateral shoots will cause mortality. In 1977, 77% of the leaders were killed in one stand.

Other Noteworthy Diseases
pages 81-83

These are diseases with the potential for causing damage to natural stands, regeneration and plantations.

ABIOTIC DAMAGE

pages 87-90

Abiotic damage is caused by a variety of influences, e.g., drought, frost, wind, and winter drying. Weakened trees are susceptible to any of a number of insects and diseases. Damage has been reported periodically since 1965.

INSECTS

Eastern Blackheaded Budworm, *Acleris variana* (Fern.)

Host(s): spruce,fir [Major]

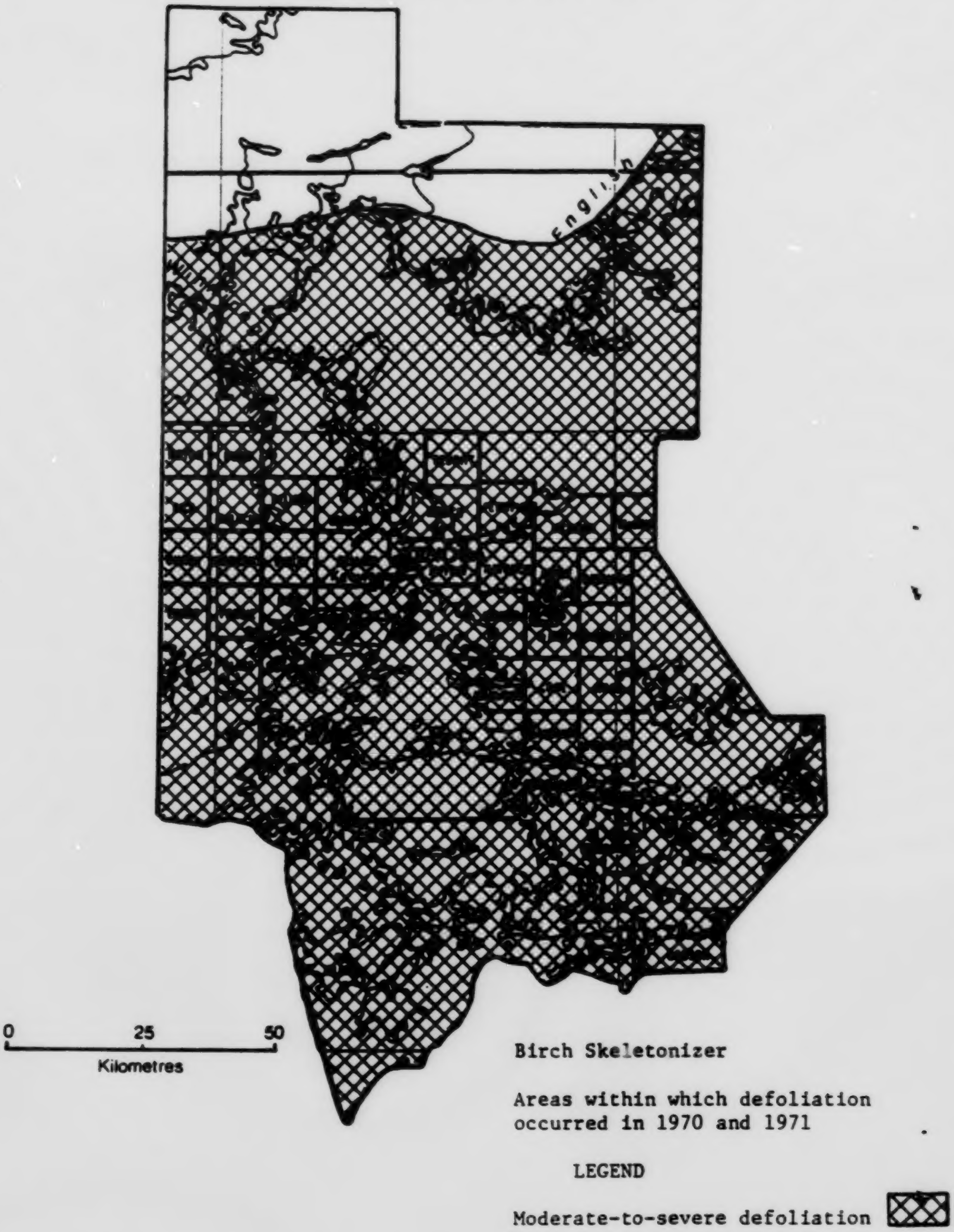
Year	Remarks
1950-1958	not reported
1953	low numbers at Indian Lake
1954-1959	not reported
1960-1961	trace populations
1962-1963	not reported
1964	lightly infested trees in Melick Twp
1965-1966	not reported
1967	trace populations at a few locations
1968-1980	not reported

Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

Host(s): birch [Major]

Year	Remarks
1950-1955	not reported
1956	Moderate-to-severe damage occurred in the northwestern part of the district; light defoliation was reported at many points along Highway 71 between Longbow Corners and Sioux Narrows.
1957-1964	not reported
1965	Light defoliation occurred on Split Rock Island, in Lake of the Woods.
1966-1969	not reported
1970-1971	Moderate-to-severe defoliation occurred over almost the entire district (see map, page 10).
1972-1973	moderate-to-severe defoliation throughout the district
1974	The infestation collapsed.
1975-1980	not reported

KENORA DISTRICT


English
0
25
50
Kilometres

Birch Skeletonizer

Areas within which defoliation occurred in 1970 and 1971

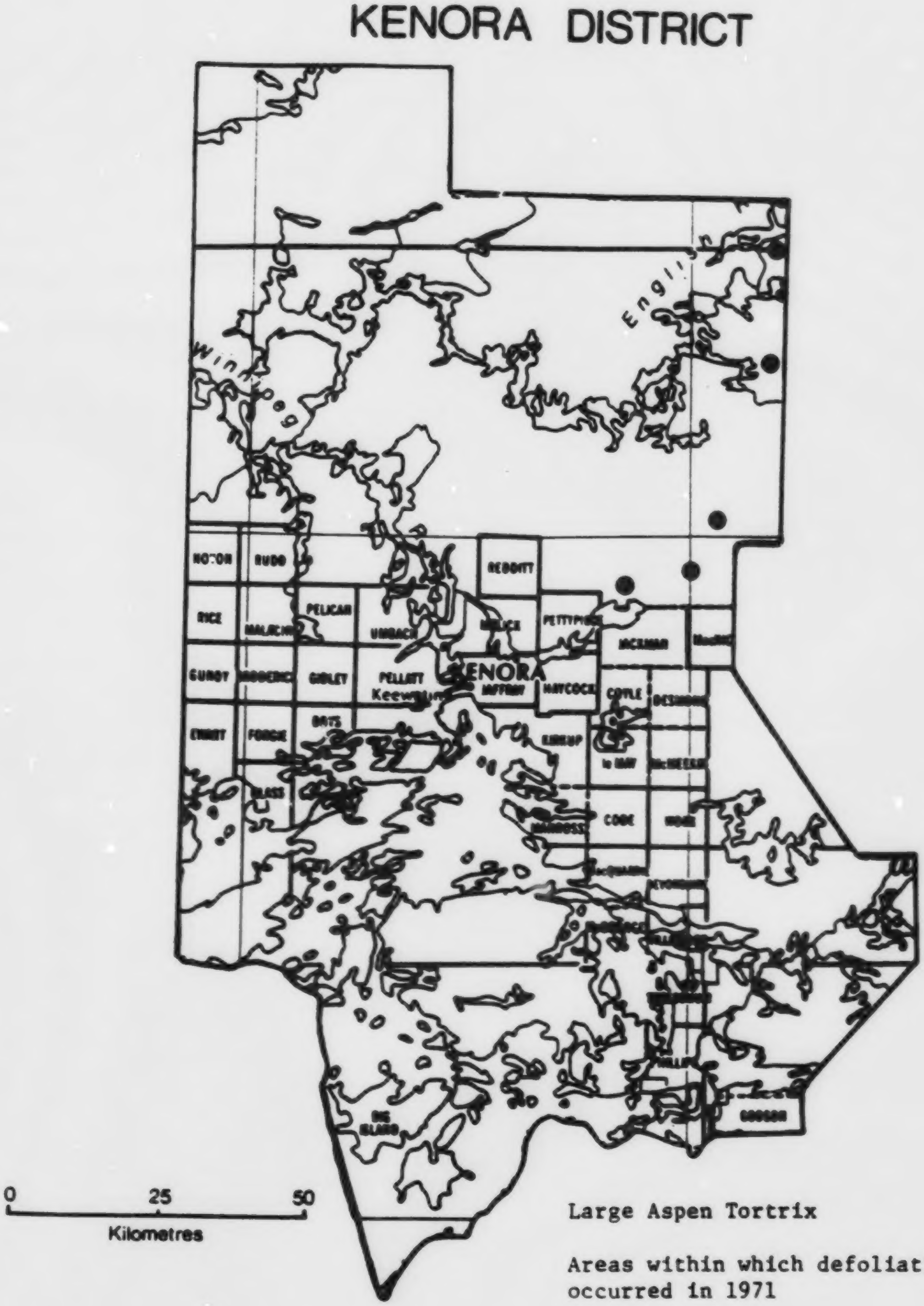
LEGEND

Moderate-to-severe defoliation ▨

Large Aspen Tortrix, *Choristoneura conflictana* (Wlk.)

Host(s): poplar [Major]

Year	Remarks
1950-1963	not reported
1964	trace populations
1965-1969	not reported
1970	Light defoliation occurred at three locations in Phillips, Redditt and Melick twps.
1971	Moderate-to-severe defoliation occurred over a large area northeast of Kenora (see map, page 12).
1972	The infestation collapsed.
1973-1974	trace populations
1975-1980	not reported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REDDITT
RICE
PELICAN
PETTYPIECE
GUNDY
GIDLEY
PELLATT
KENORA
Keewatin
JAFFRAY
HAYCOCK
COYLE
DESMOND
EWART
FORGIE
KIRKUP
GLASS
CODE
0
25
50
Kilometres

Large Aspen Tortrix

Areas within which defoliation occurred in 1971

LEGEND

Moderate-to-severe defoliation ●

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

Host(s): spruce,fir [Major]

Year	Remarks
1950	Moderate-to-severe defoliation occurred throughout the northeastern part of the district and south of Kenora (see map, page 15).
1951	Moderate-to-severe defoliation recurred over a large section of the district (see map, page 16) and tree mortality occurred at the north end of the district (see map, page 17).
1952	Moderate-to-severe defoliation recurred over most of the district (see map, page 18).
1953	Moderate-to-severe defoliation was common, except in the western part of the district (see map, page 19).
1954	Moderate-to-severe defoliation recurred over much of the district (see map, page 20).
1955	Heavy infestations persisted and tree mortality continued to increase (see map, page 21).
1956	Moderate-to-severe defoliation was general over most of the district (see map, page 22) and tree mortality continue to increase (see map, page 23).
1957	Slight increases in the area of moderate-to-severe defoliation were noted (see map, page 24).
1958	Moderate-to-severe defoliation was found throughout most of the district (see map, page 25).
1959	A pronounced decline in population levels occurred (see map, page 26).
1960	The infestation collapsed totally. Balsam fir mortality, as a result of several years of infestation, was evident throughout most of the district (see map, page 27).
1961-1964	not reported
1965-1968	trace populations
1969	low numbers of white spruce in MacNicol Twp
1970-1974	not reported

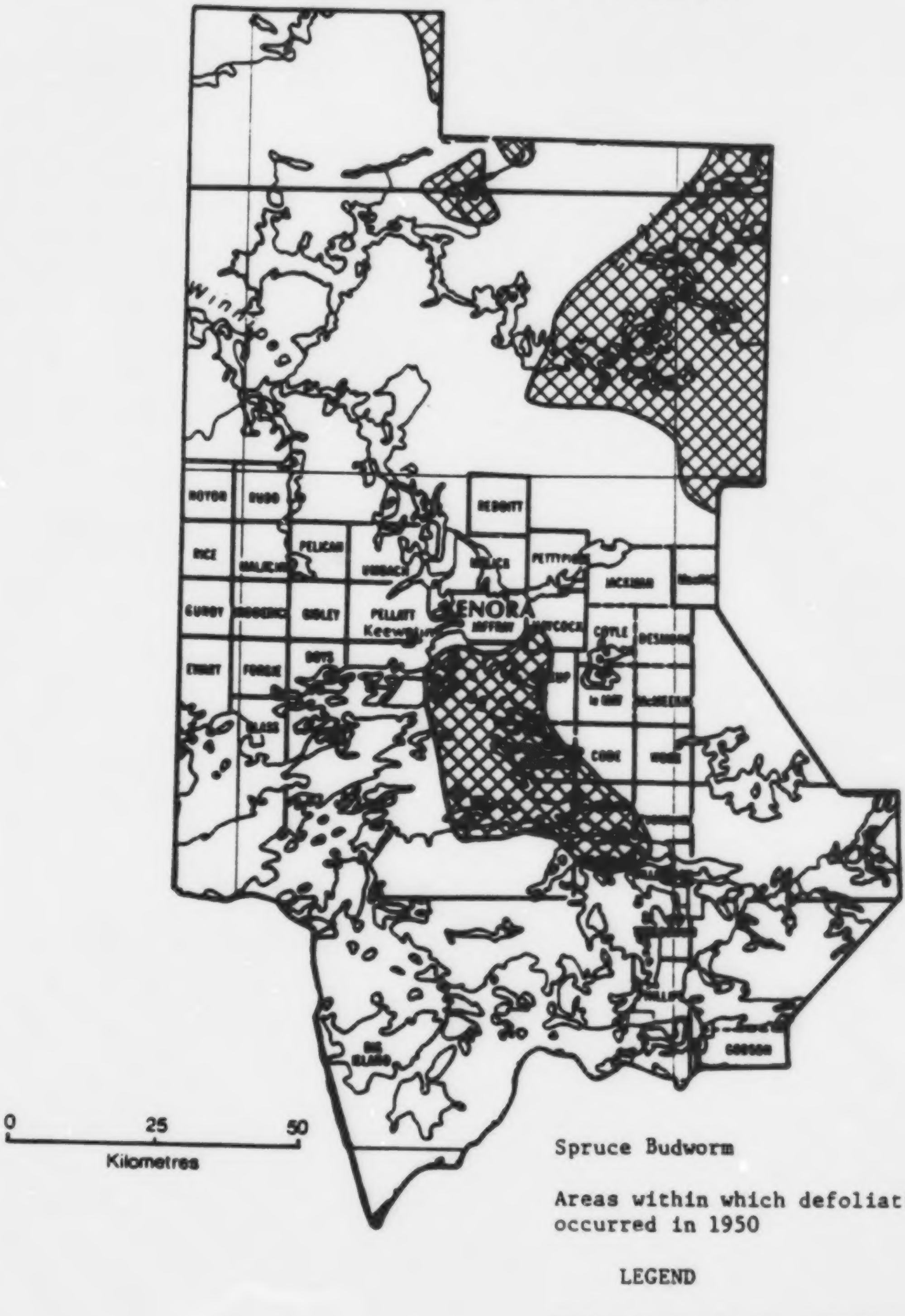
(cont'd)

Spruce Budworm, *Choristoneura fumiferana* (Clem.) (concl.)

Host(s): spruce,fir [Major]

Year	Remarks
1975	low numbers common throughout the district
1976	trace populations
1977	light infestation from High Lake in Ewart Twp north to South Scot Lake in Noyon Twp
1978-1979	Trace populations were reported in the areas affected in 1977.
1980	Moderate-to-severe defoliation of white spruce occurred at Umfreville Lake.

KENORA DISTRICT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Keewatin
RICE
GUNDY
PELICAN
PELLATT
JAFFRAY
JACKMAN
COYLE
CODE
BIG ISLAND
0
25
50
Kilometres

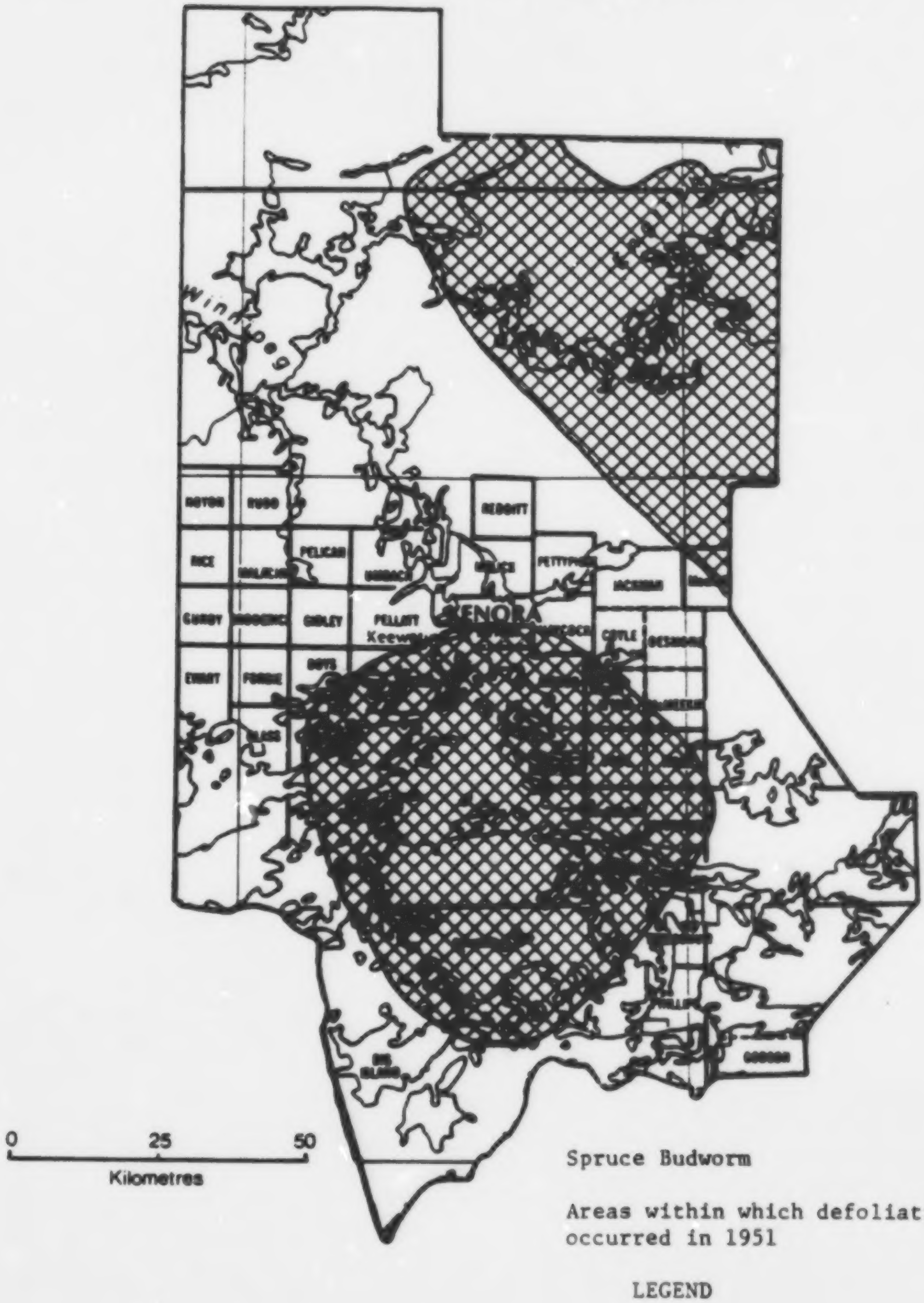
Spruce Budworm

Areas within which defoliation
occurred in 1950

LEGEND

Moderate-to-severe defoliation ▨

KENORA DISTRICT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Keewatin
REDDITT
PELICAN
JACKSON
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50
Kilometres

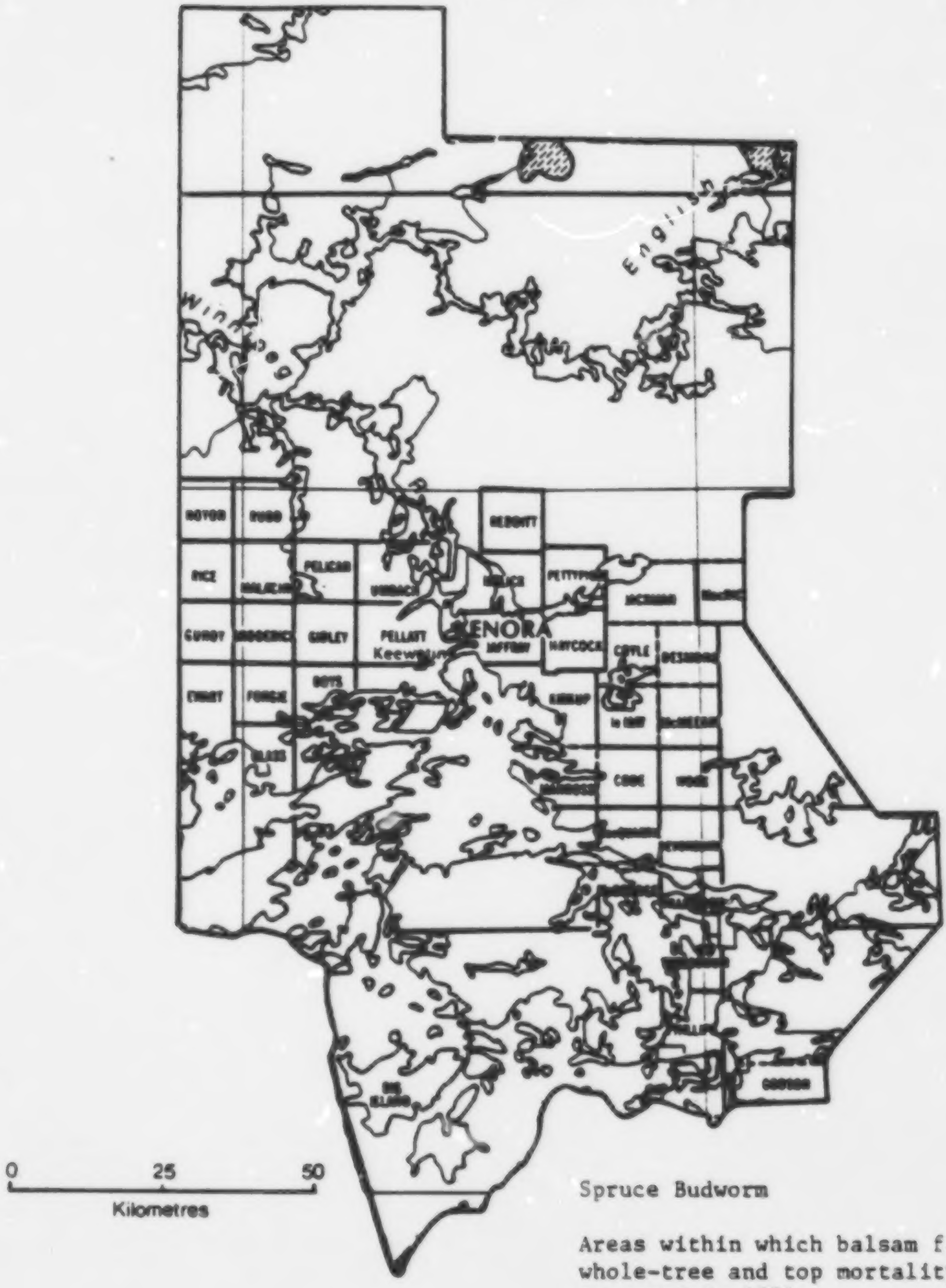
Spruce Budworm

Areas within which defoliation occurred in 1951

LEGEND

Moderate-to-severe defoliation ▨

KENORA DISTRICT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PELICAN
GIDLEY
PELLATT
KENORA
Keewatin
JAFFRAY
HAYCOCK
COYLE
FORGIE
BOYS
COOK
0
25
50
Kilometres

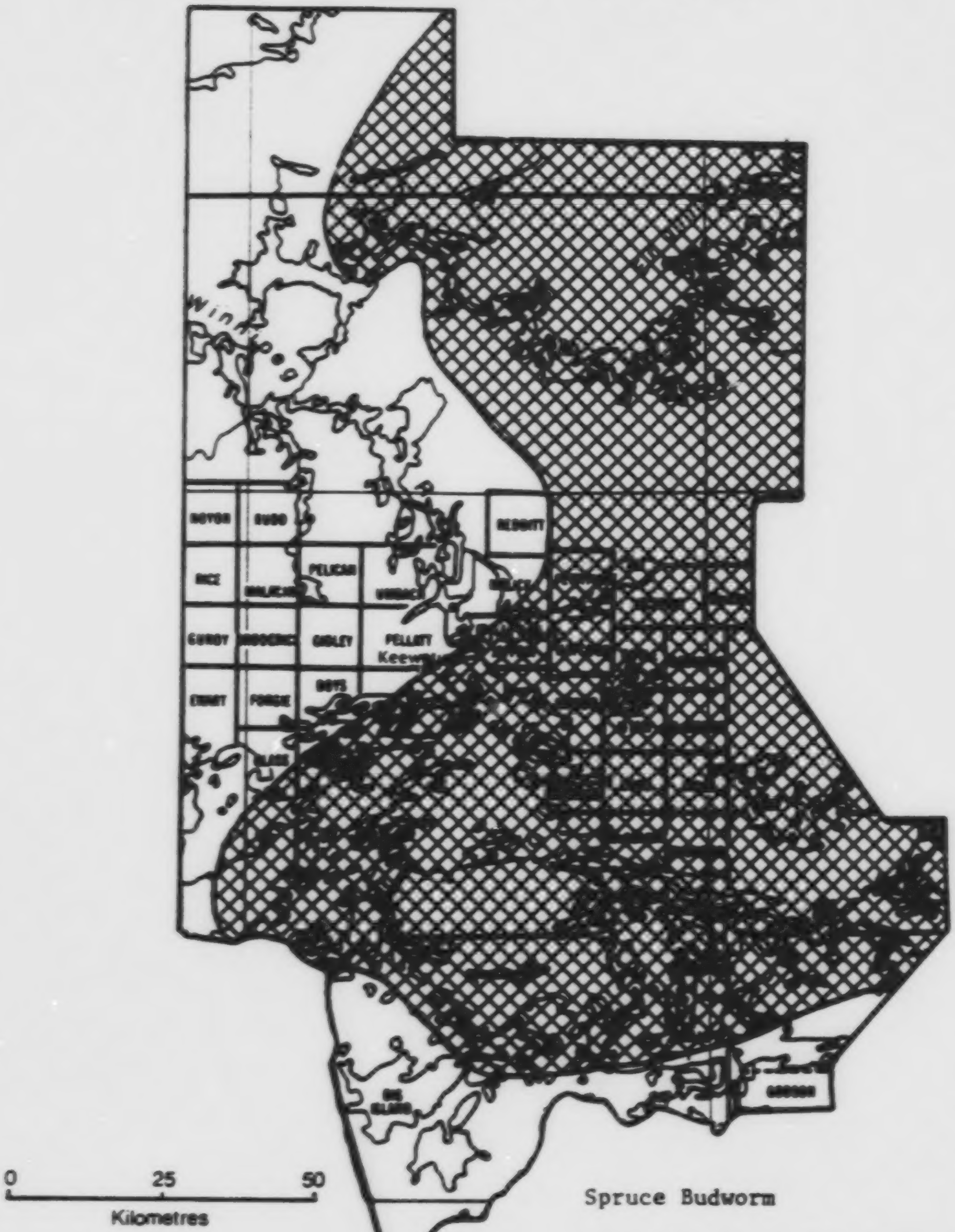
Spruce Budworm

Areas within which balsam fir whole-tree and top mortality occurred in 1951

LEGEND

Mortality ▨

KENORA DISTRICT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REDDITT
RICE
PELICAN
GIDLEY
PELLATT
Keew
EWART
FORGIE
BOYS
GLASS
BIG ISLAND
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25
50
Kilometres

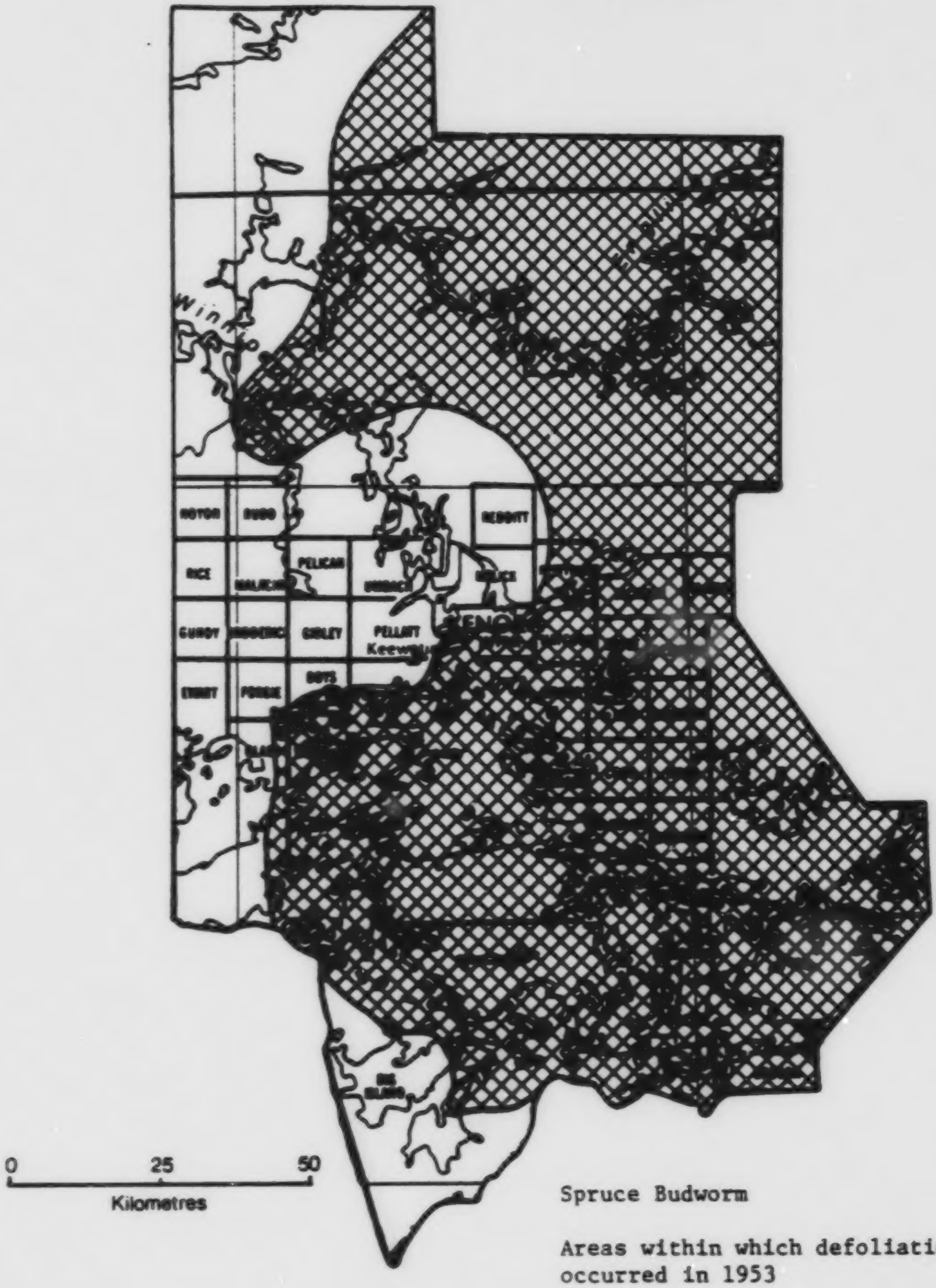
Spruce Budworm

Areas within which defoliation occurred in 1952

LEGEND

Moderate-to-severe defoliation ▨

KENORA DISTRICT


ROYTON
REDDITT
RICE
PELICAN
GUNDY
GIDLEY
PELLATT
Keewatin
KENORA
FORGIE
BOYS
BIG ISLAND
0
25
50
Kilometres

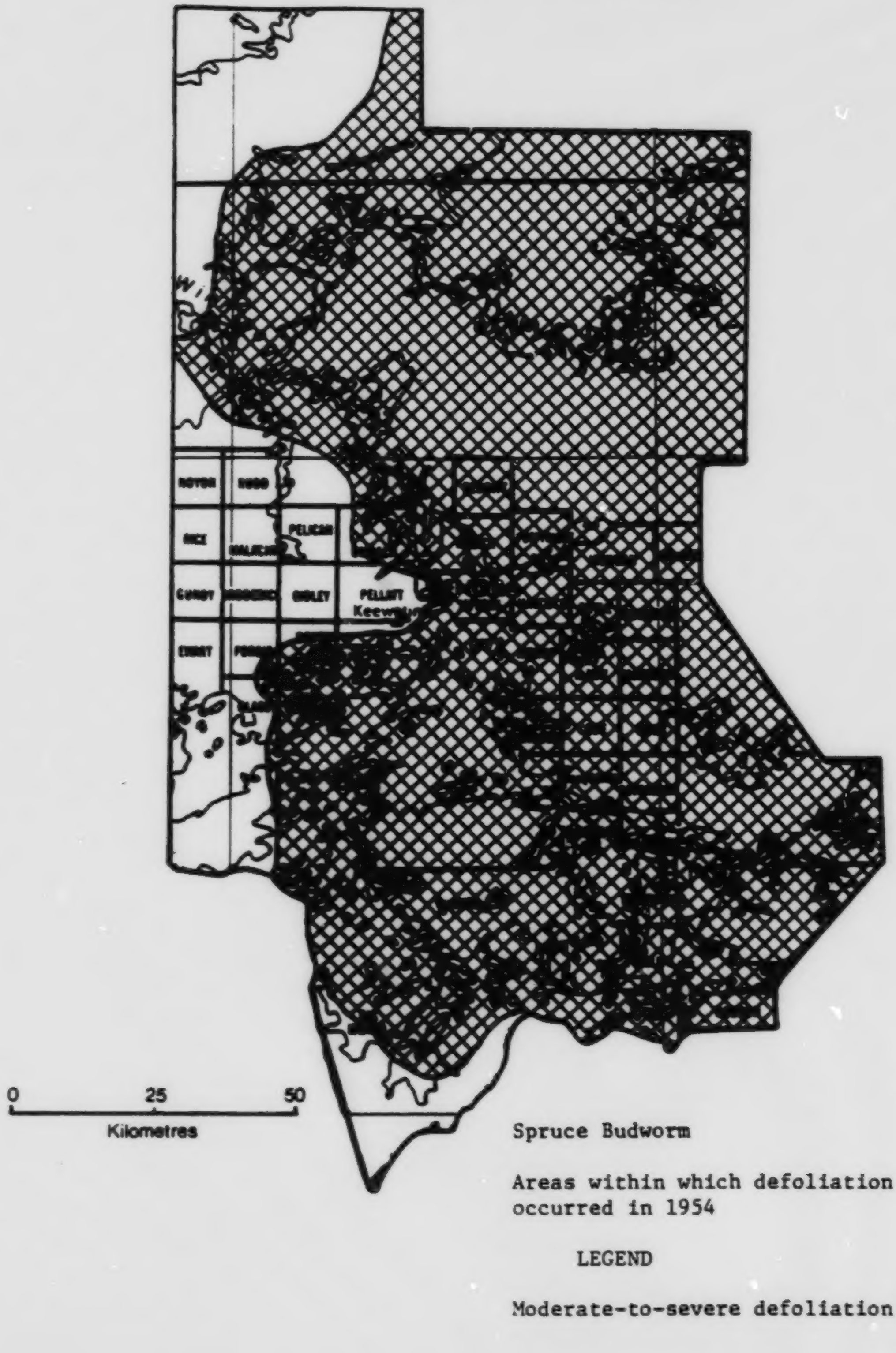
Spruce Budworm

Areas within which defoliation occurred in 1953

LEGEND

Moderate-to-severe defoliation ▨

KENORA DISTRICT


RICE
PELICAN
GIDLEY
PELLATT
EWART
0
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Kilometres

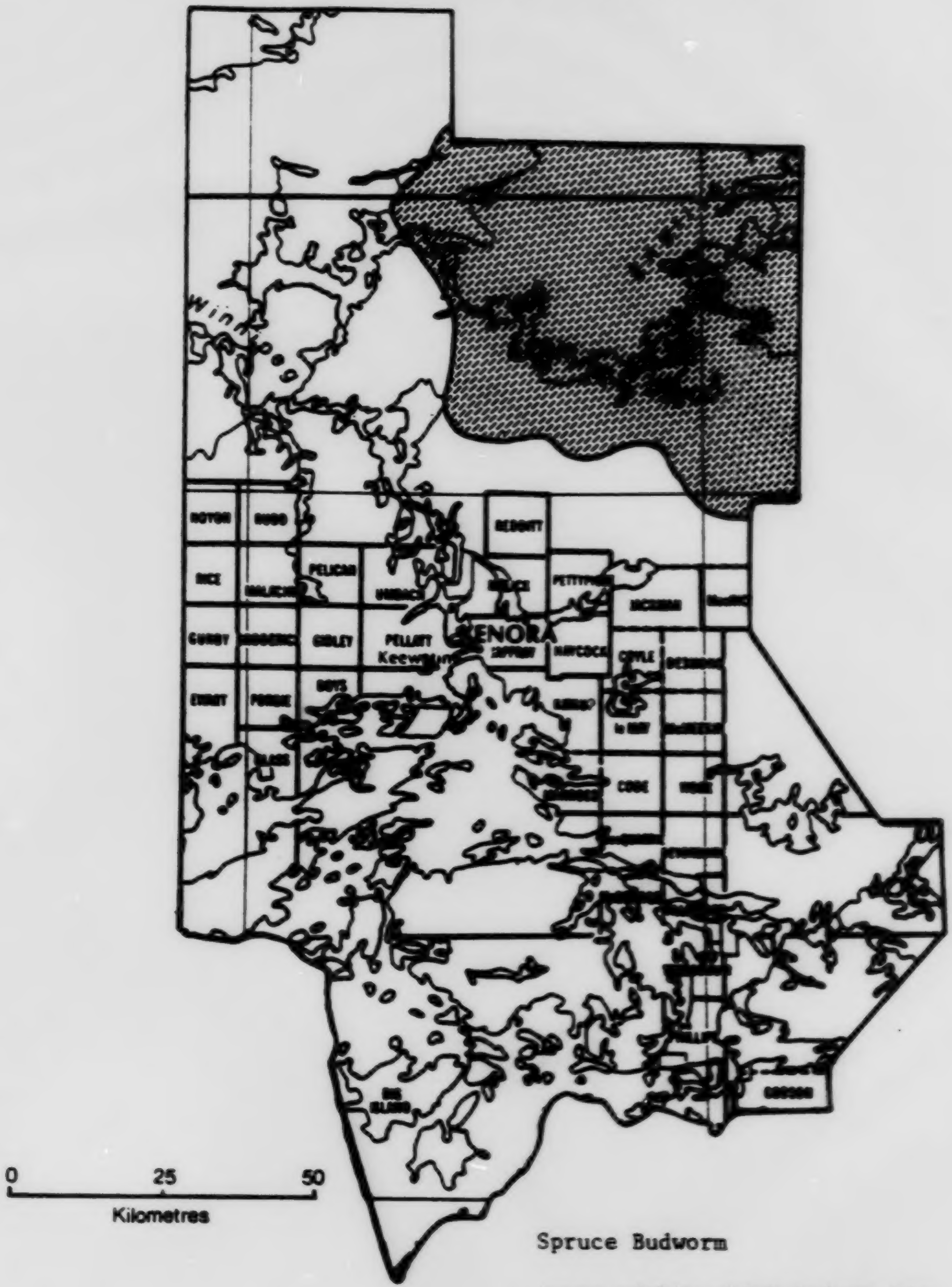
Spruce Budworm

Areas within which defoliation occurred in 1954

LEGEND

Moderate-to-severe defoliation ▨

KENORA DISTRICT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KENORA
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HAYCOCK
COYLE
BOYS
FORDE
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REDDITT
0
25
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Kilometres

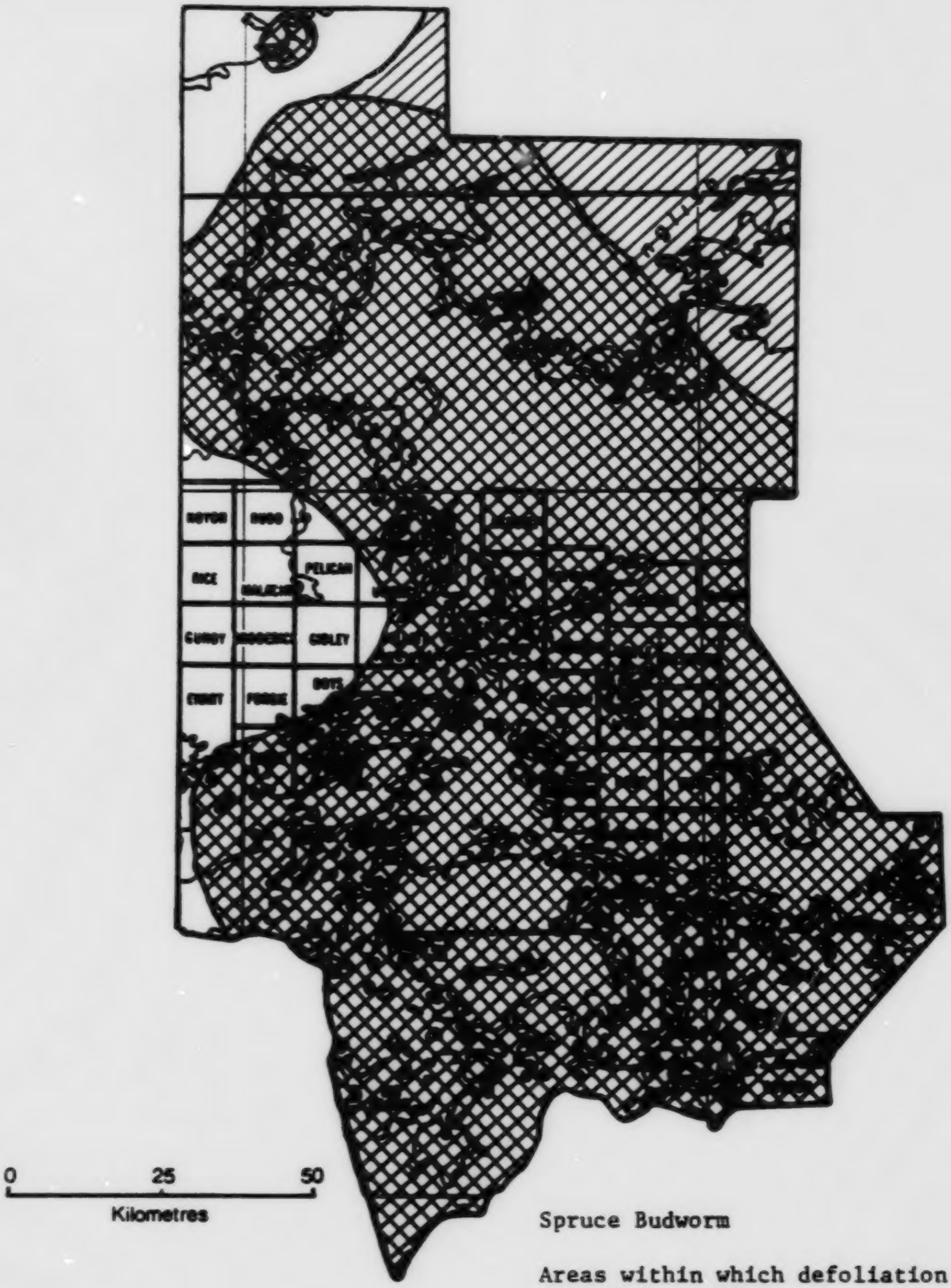
Spruce Budworm

Areas within which balsam fir whole-tree and top mortality occurred in 1955

LEGEND

Mortality ▨

KENORA DISTRICT


RICE
PELICAN
GIDLEY
BOYS
FORGIE
0
25
50
Kilometres

Spruce Budworm

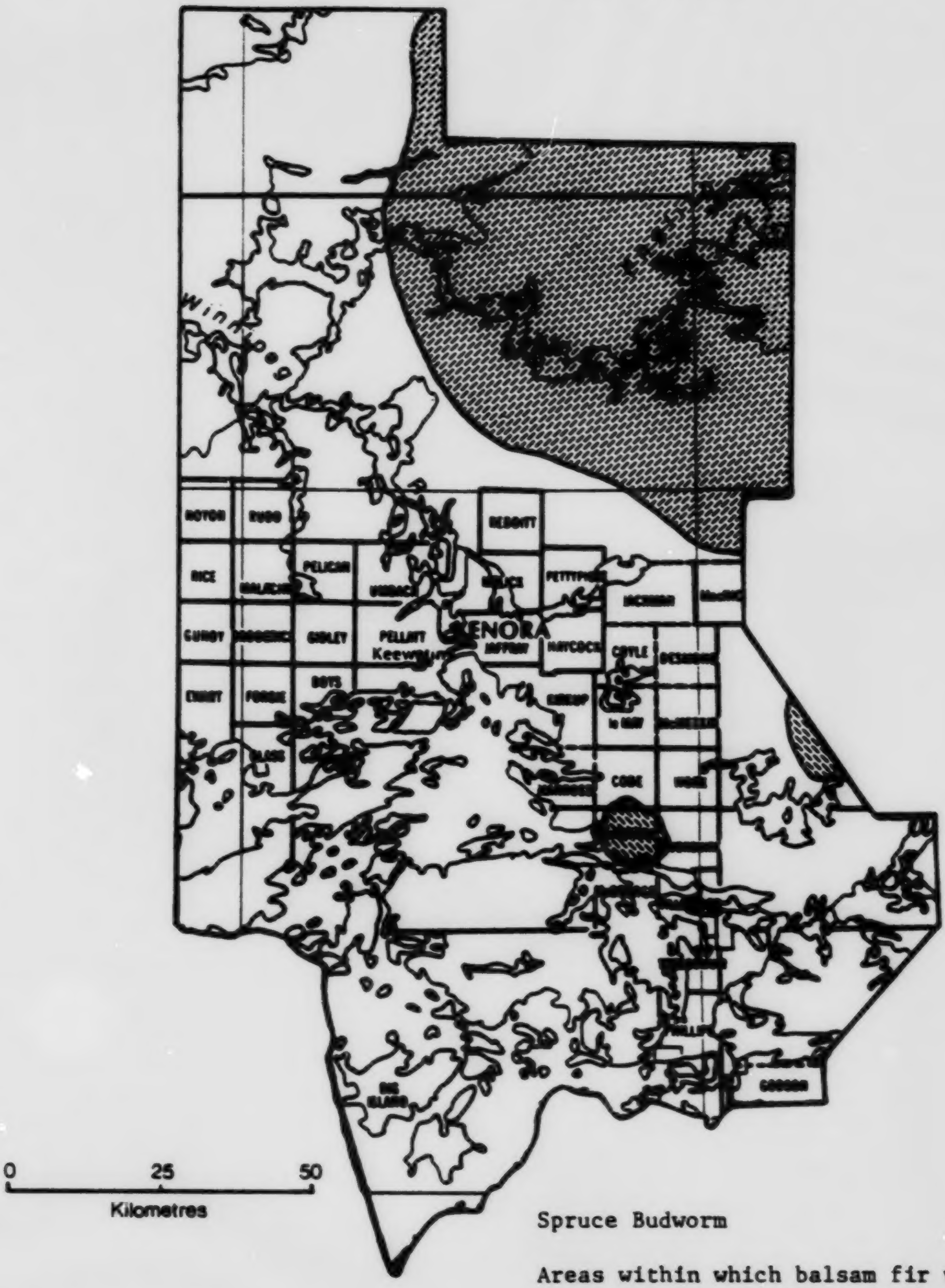
Areas within which defoliation occurred in 1956

LEGEND

Light defoliation

Moderate-to-severe defoliation ▩

KENORA DISTRICT


Winn
REDDITT
RICE
PELICAN
PETTYPIECE
JACKMAN
GUNDY
GIDLEY
PELLATT
KENORA
Keewatin
JAFFRAY
HAYCOCK
COYLE
DESMOND
FORGIE
BOYS
CODE
0
25
50
Kilometres

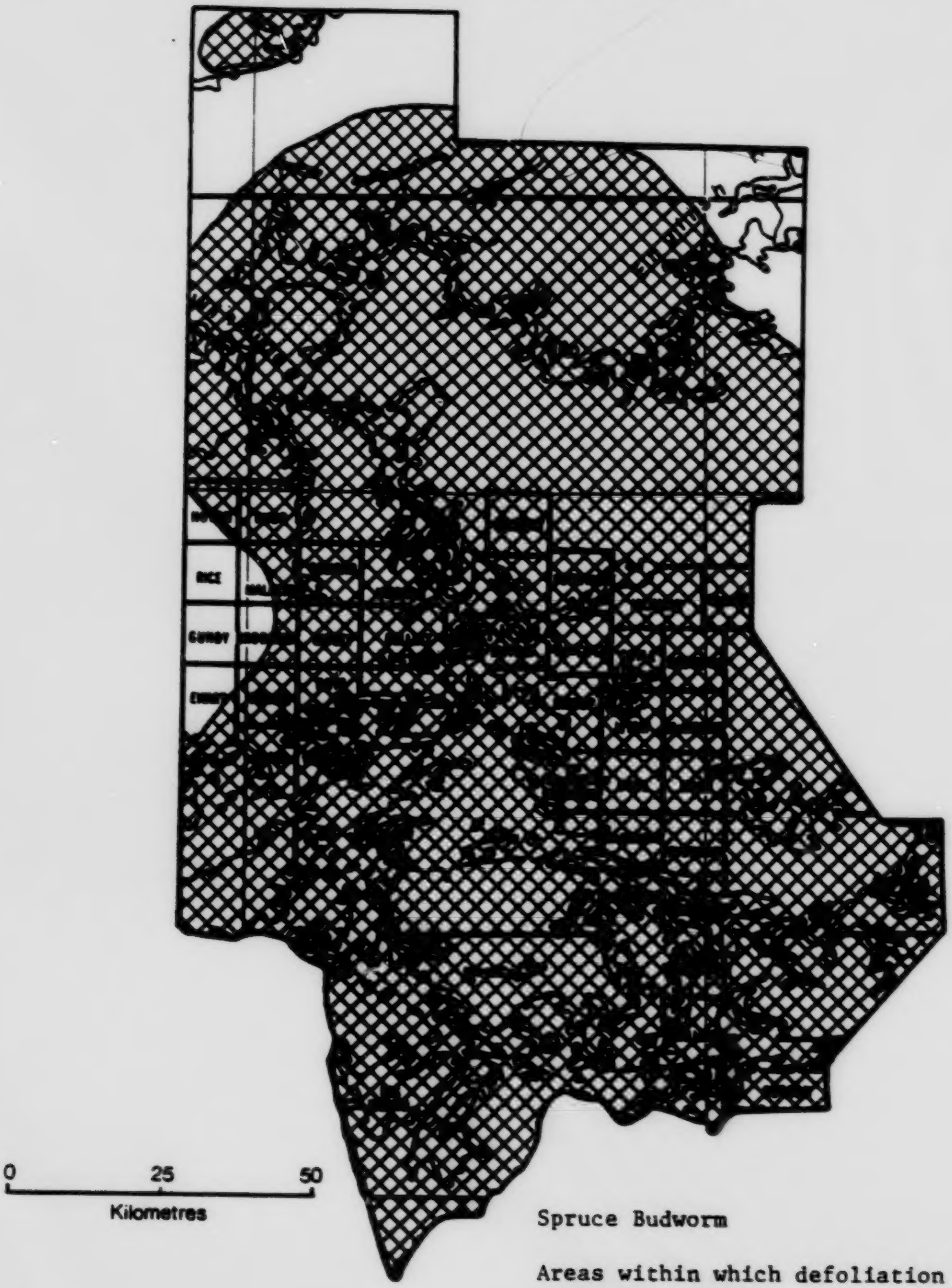
Spruce Budworm

Areas within which balsam fir whole-tree and top mortality occurred in 1956

LEGEND

Mortality ▨

KENORA DISTRICT


RICE
0
25
50
Kilometres

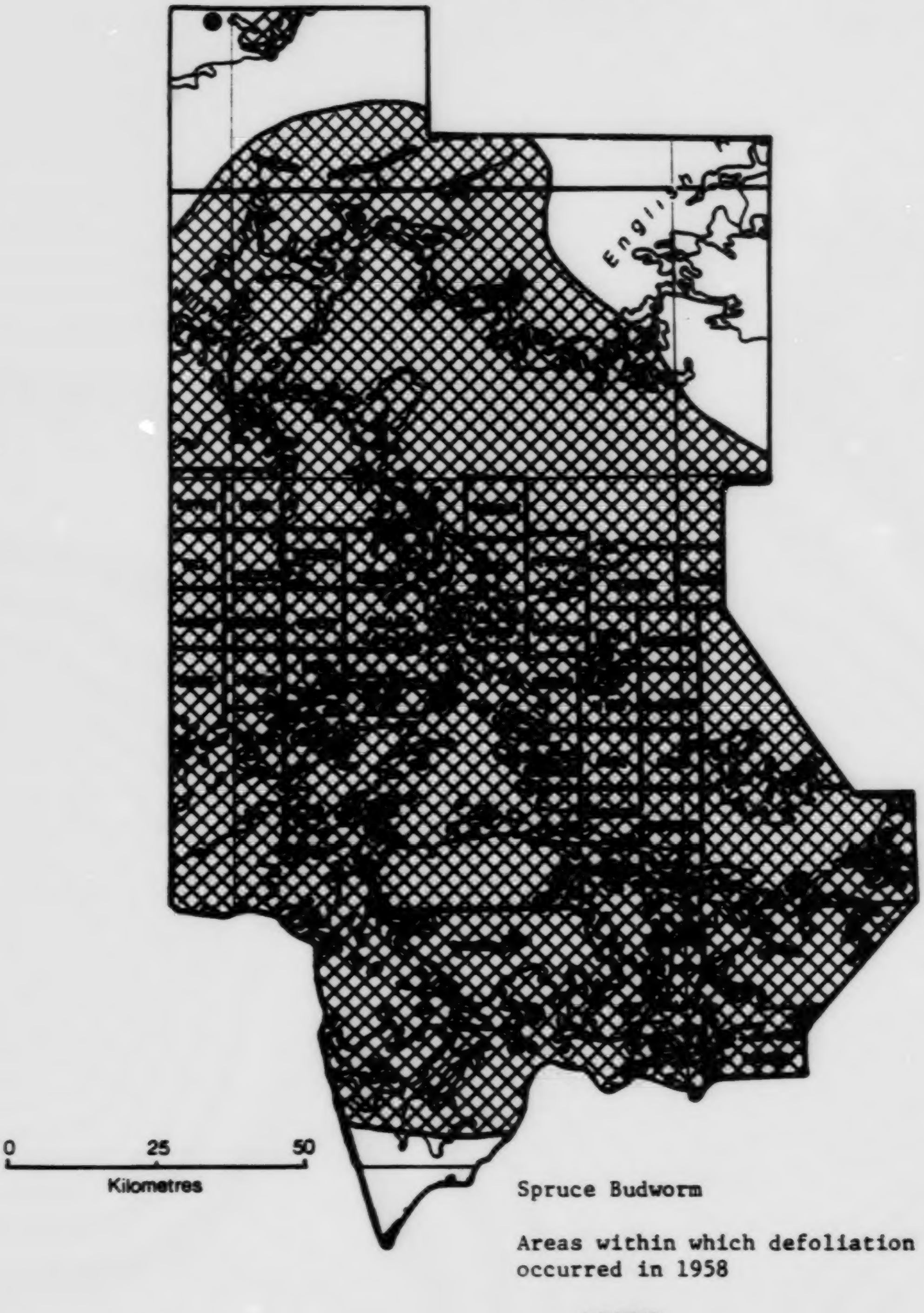
Spruce Budworm

Areas within which defoliation occurred in 1957

LEGEND

Moderate-to-severe defoliation ▨

KENORA DISTRICT


Engli
0
25
50
Kilometres

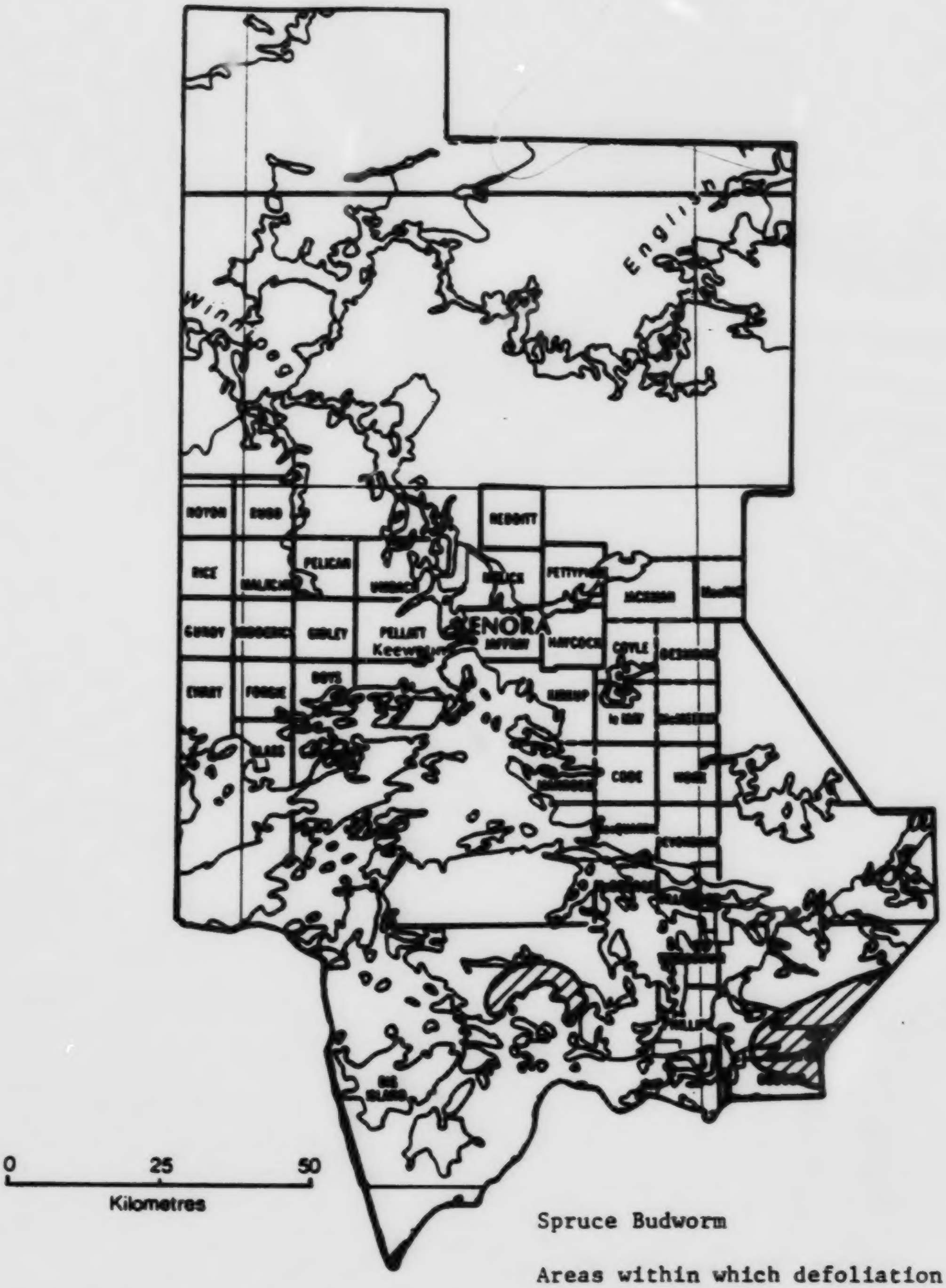
Spruce Budworm

Areas within which defoliation occurred in 1958

LEGEND

Moderate-to-severe defoliation ▨

KENORA DISTRICT


English
Winnipeg
REDDITT
PELICAN
KENORA
Keewatin
JACKSON
COYLE
CODE
0
25
50
Kilometres

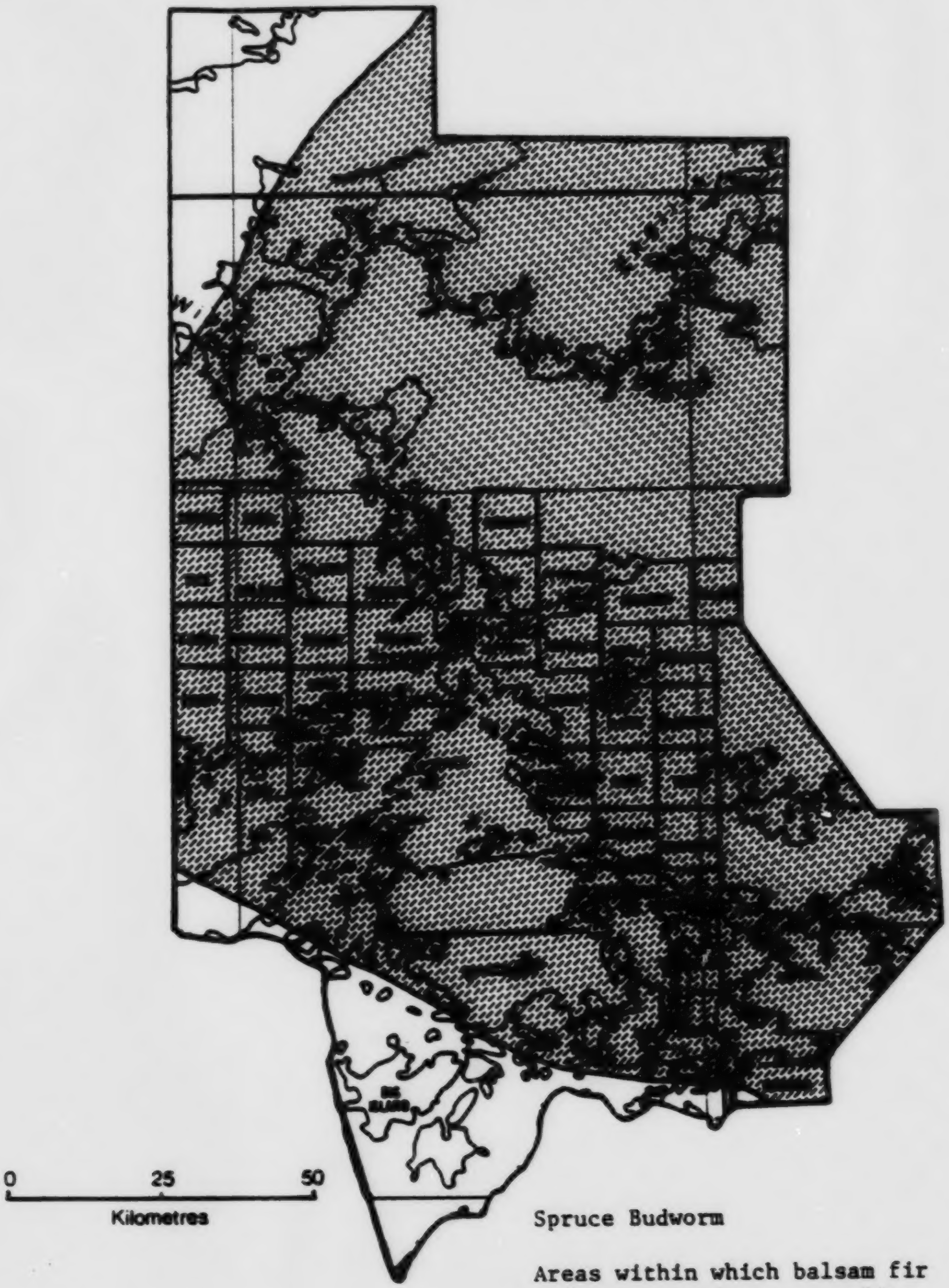
Spruce Budworm

Areas within which defoliation occurred in 1959

LEGEND

Light defoliation ▨

KENORA DISTRICT


0
25
50
Kilometres

Spruce Budworm

Areas within which balsam fir whole-tree and top mortality occurred in 1960

LEGEND

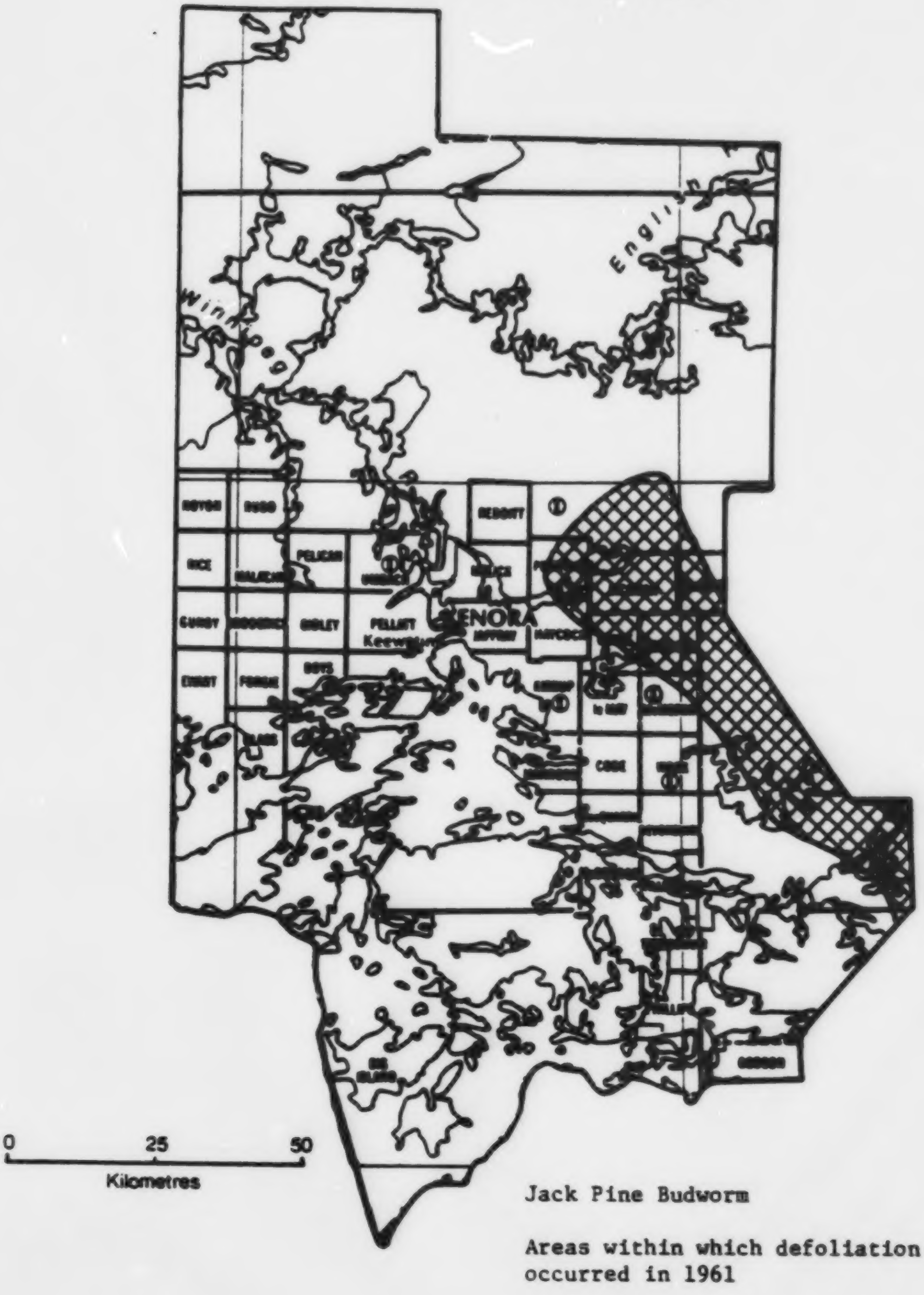
Mortality ▨

Jack Pine Budworm, *Choristoneura pinus pinus* Free.

Host(s): jP [Major]

Year	Remarks
1950	Varying degrees of infestation were found throughout the central part of the district.
1951-1953	not reported
1954	A new area of moderate-to-severe defoliation occurred along the east shore of Maynard Lake.
1955	The Maynard Lake infestation was reduced to light levels.
1956-1960	not reported
1961	A medium-to-heavy infestation occurred in the eastern part of the district along the Dryden district boundary. Five small areas of light damage were reported outside the main infestation (see map, page 29).
1962	The area of moderate-to-severe defoliation broke up into several smaller areas (see map, page 30).
1963	Populations were reduced again. Only one pocket of light infestation occurred, at Otterskin Lake.
1964-1965	A small area of medium-to-heavy infestation extended eastward from the Atikokan and Rainmaker lakes area to the Dryden district boundary.
1966	A major outbreak of the insect occurred and moderate-to-severe defoliation was recorded across the entire southern half of the district (see map, page 31).
1967	The infestation persisted across most of the district (see map, page 32).
1968	Moderate-to-severe defoliation was recorded across much of the eastern part of the district (see map, page 33).
1969	The infestation collapsed; few insects were found.
1970-1973	not reported
1974	trace populations in Pelican Twp
1975-1978	not reported
1979	trace populations in the northwest corner of the district
1980	trace populations in Ewart Twp

KENORA DISTRICT


Winn
English
REDDITT
RICE
PELICAN
GUNDY
PELLATT
KENORA
Keewatin
JAFFRAY
HAYCOCK
BOYS
COOK
①
0
25
50
Kilometres

Jack Pine Budworm

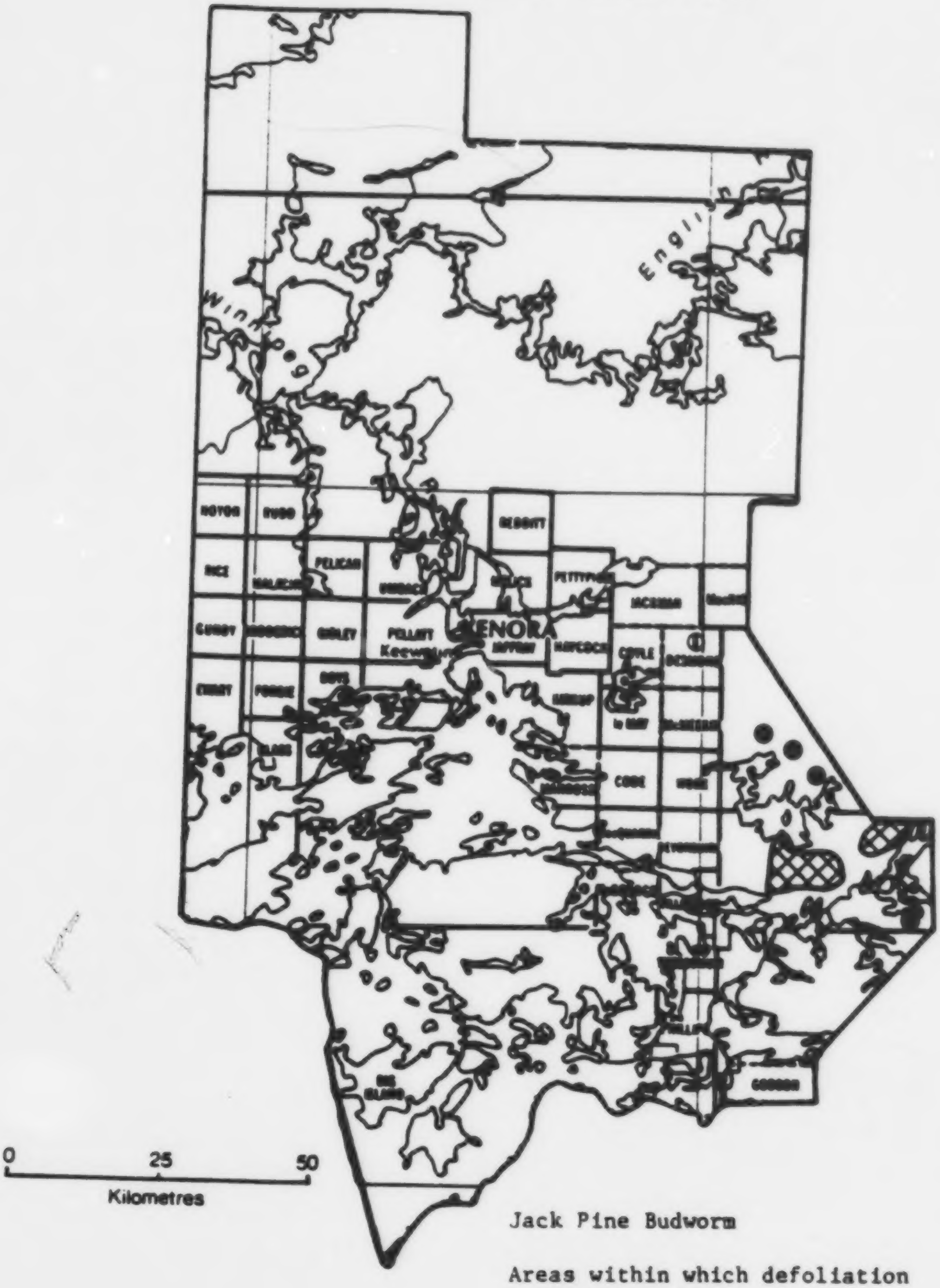
Areas within which defoliation occurred in 1961

LEGEND

Light defoliation ①

Moderate-to-severe defoliation ▩

KENORA DISTRICT


Winnipeg
English
KENORA
Keewatin
RICE
PELICAN
GUNDY
PELLATT
HAYCOCK
JACKSON
COYLE
CODE
0
25
50
Kilometres

Jack Pine Budworm

Areas within which defoliation occurred in 1962

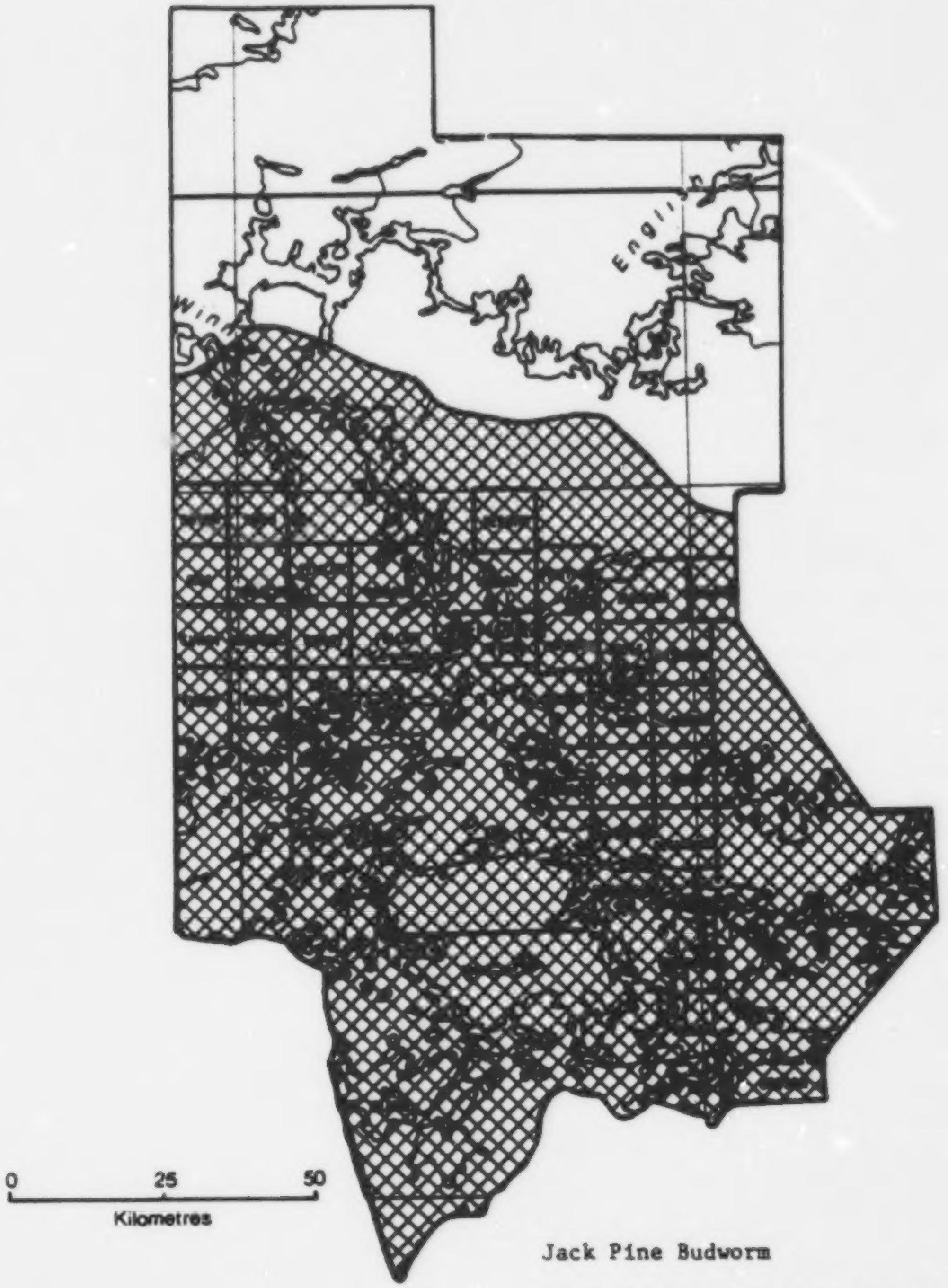
LEGEND

Light defoliation ①

Moderate-to-severe defoliation

● or ▨

KENORA DISTRICT


Win
Engl
0
25
50
Kilometres

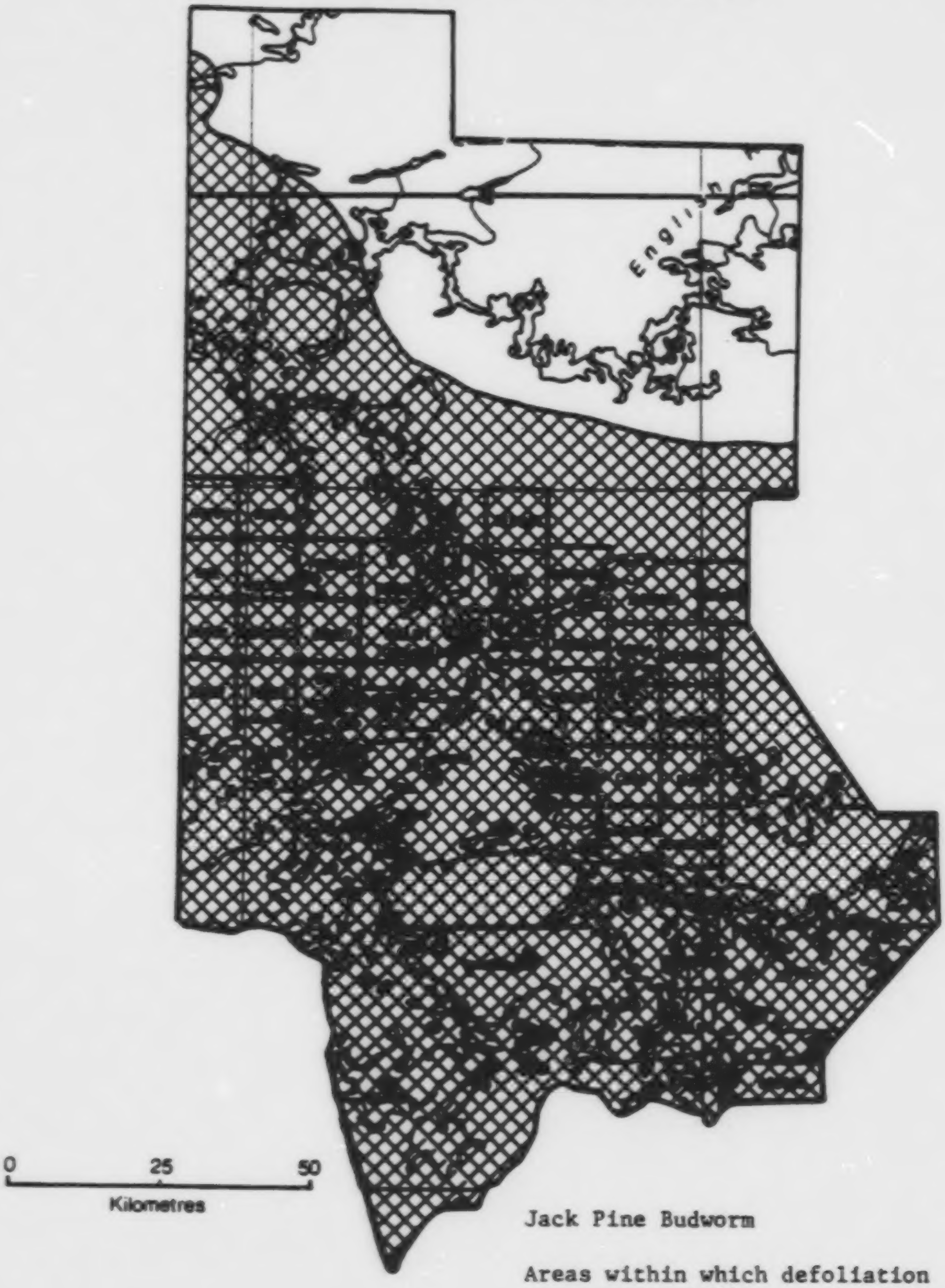
Jack Pine Budworm

Areas within which defoliation occurred in 1966

LEGEND

Moderate-to-severe defoliation ▨

KENORA DISTRICT


English
0
25
50
Kilometres

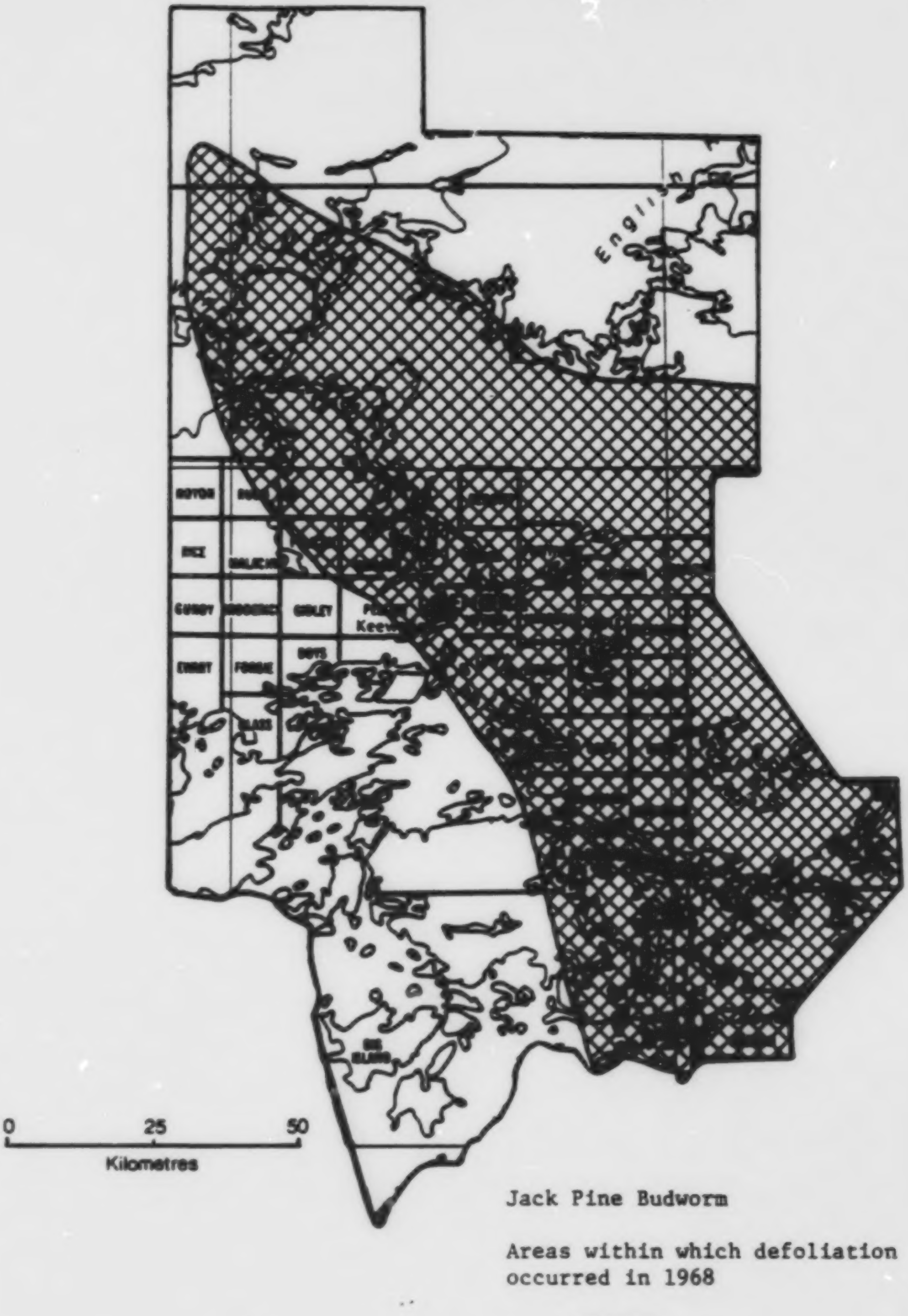
Jack Pine Budworm

Areas within which defoliation occurred in 1967

LEGEND

Moderate-to-severe defoliation ▨

KENORA DISTRICT


English
Keew
0
25
50
Kilometres

Jack Pine Budworm

Areas within which defoliation occurred in 1968

LEGEND

Moderate-to-severe defoliation ▨

Aspen Twoleaf Tier, *Enargia decolor* (Wlk.)

Host(s): poplar [Major]

Year	Remarks
1950-1958	not reported
1959	Varying degrees of defoliation occurred within a narrow band that extended from the Dryden District boundary northwest to Ball Lake.
1960	Populations generally declined. Low populations were found in the Roget and Rowdy lakes areas.
1961	Populations continued to decline. One small area of light infestation was observed in Melick Twp, north of Kenora.
1962	one small pocket of light infestation in Willingdon Twp
1963-1968	not reported
1969	High popluations were observed in Phillips and Haycock twps.
1970	light infestation along Kenricia Road
1971-1980	not reported

Eastern Pine Shoot Borer, *Eucosma gloriola* Heinr.

Host(s): pine [Major]

Year	Remarks
1950-1958	not reported
1959	Light infestations occurred in plantations and in regeneration stands in Redditt and Willingdon twps.
1960	Little change in populations occurred.
1961-1963	not reported
1964	26% of leaders infested in Willingdon Twp
1965	The infestation persisted in Willingdon Twp at the same level as in the previous year.

(cont'd)

Eastern Pine Shoot Borer, *Eucosma gloriola* Heinr. (concl.)

Host(s): pine [Major]

Year	Remarks
1966	not reported
1967	trace populations
1968-1977	not reported
1978	trace populations
1979	3% leader mortality on Gundy Lake Road
1980	3% leader mortality in Gundy Twp

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

Host(s): deciduous [Major]

Year	Remarks
1950	There were three relatively small areas of moderate-to-severe defoliation (see map, page 37).
1951	The 1950 infestation expanded slightly (see map, page 38).
1952	The infestation expanded to include all but a relatively small section in the northwestern part of the district (see map, page 39).
1953	Moderate-to-severe defoliation was common throughout the southern part of the district (see map, page 40).
1954	The infestation collapsed.
1955-1959	not reported
1960	A pocket of medium-to-heavy infestation occurred southeast of Minaki, and small areas of light infestation were recorded at several points elsewhere (see map, page 41).
1961	Population levels increased, particularly in the Kenora area (see map, page 42).

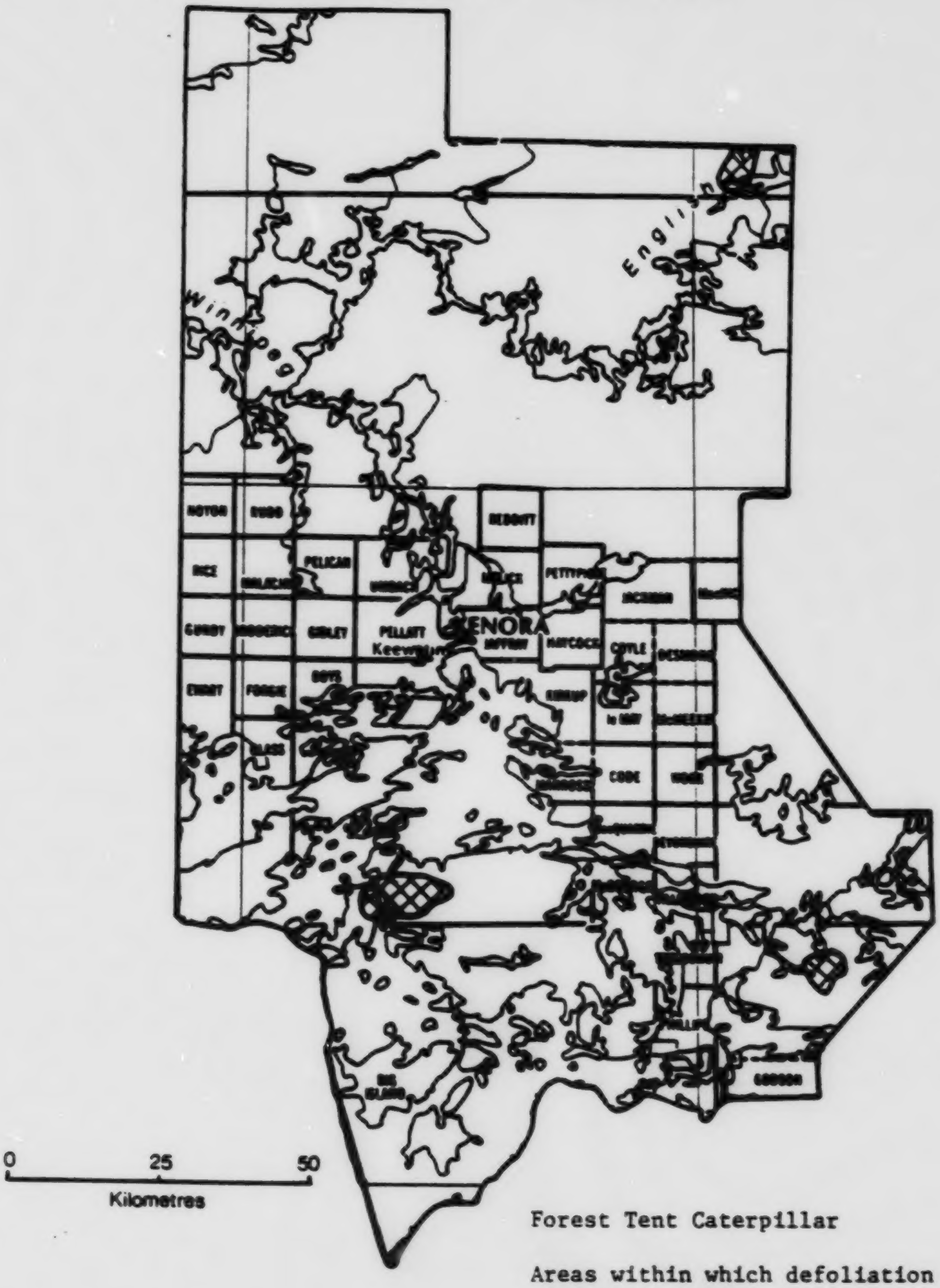
(cont'd)

Forest Tent Caterpillar, *Malacosoma disstria* Hbn. (concl.)

Host(s): deciduous [Major]

Year	Remarks
1962	Infestations continued to expand and there were extensive areas of severe defoliation (see map, page 43).
1963	Moderate-to-severe defoliation recurred over most of the district (see map, page 44).
1964	Light defoliation was recorded in the Lake of the Woods area and moderate-to-severe defoliation occurred throughout the remainder of the district (see map, page 45).
1965	There was little change in the infestation boundaries (see map, page 46).
1966	The infestation collapsed as a result of weather conditions.
1967-1974	not reported
1975	Moderate-to-severe damage occurred in the extreme northwestern section of the district (see map, page 47).
1976	The infestation expanded to include almost all of the northwestern section of the district (see map, page 48).
1977	The infestation continued to expand (see map, page 49).
1978	Moderate-to-severe defoliation was found throughout the district except in a small area in the southeastern corner (see map, page 50).
1979	A marked reduction in the size and intensity of the infestation occurred (see map, page 51).
1980	The infestion collapsed.

KENORA DISTRICT


Winnipeg
English
PELICAN
RICE
GIBLEY
PELLATT
KENORA
Keewatin
BOYS
FORGIE
HAYCOCK
COYLE
CODE
GORDON
0
25
50
Kilometres

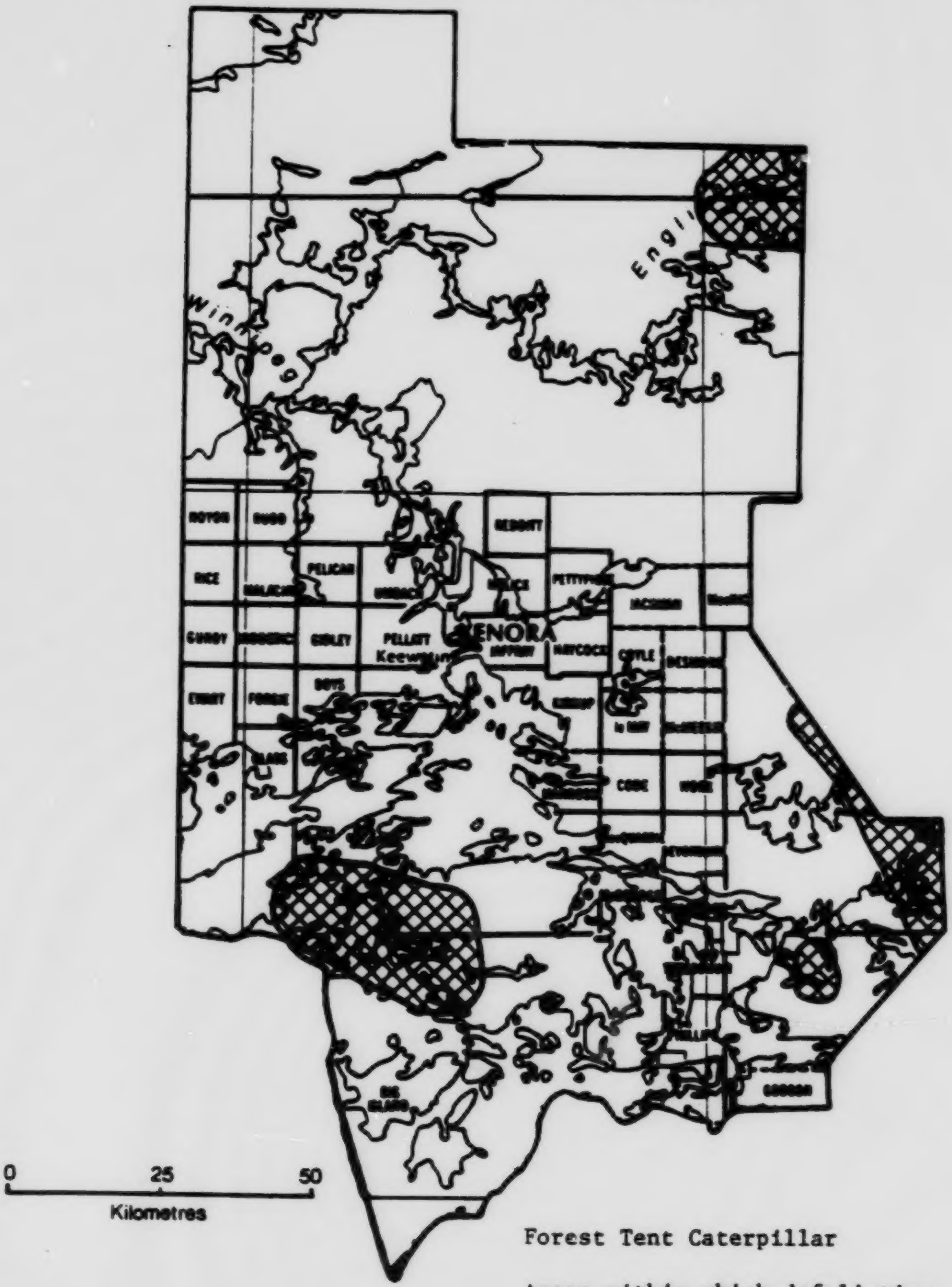
Forest Tent Caterpillar

Areas within which defoliation occurred in 1950

LEGEND

Moderate-to-severe defoliation ▨

KENORA DISTRICT


Winn
Engl
REDDITT
RICE
PELICAN
PELLATT
KENORA
Keewatin
JAFFRAY
HAYCOCK
COYLE
BOYS
CODE
BIG ISLAND
0
25
50
Kilometres

Forest Tent Caterpillar

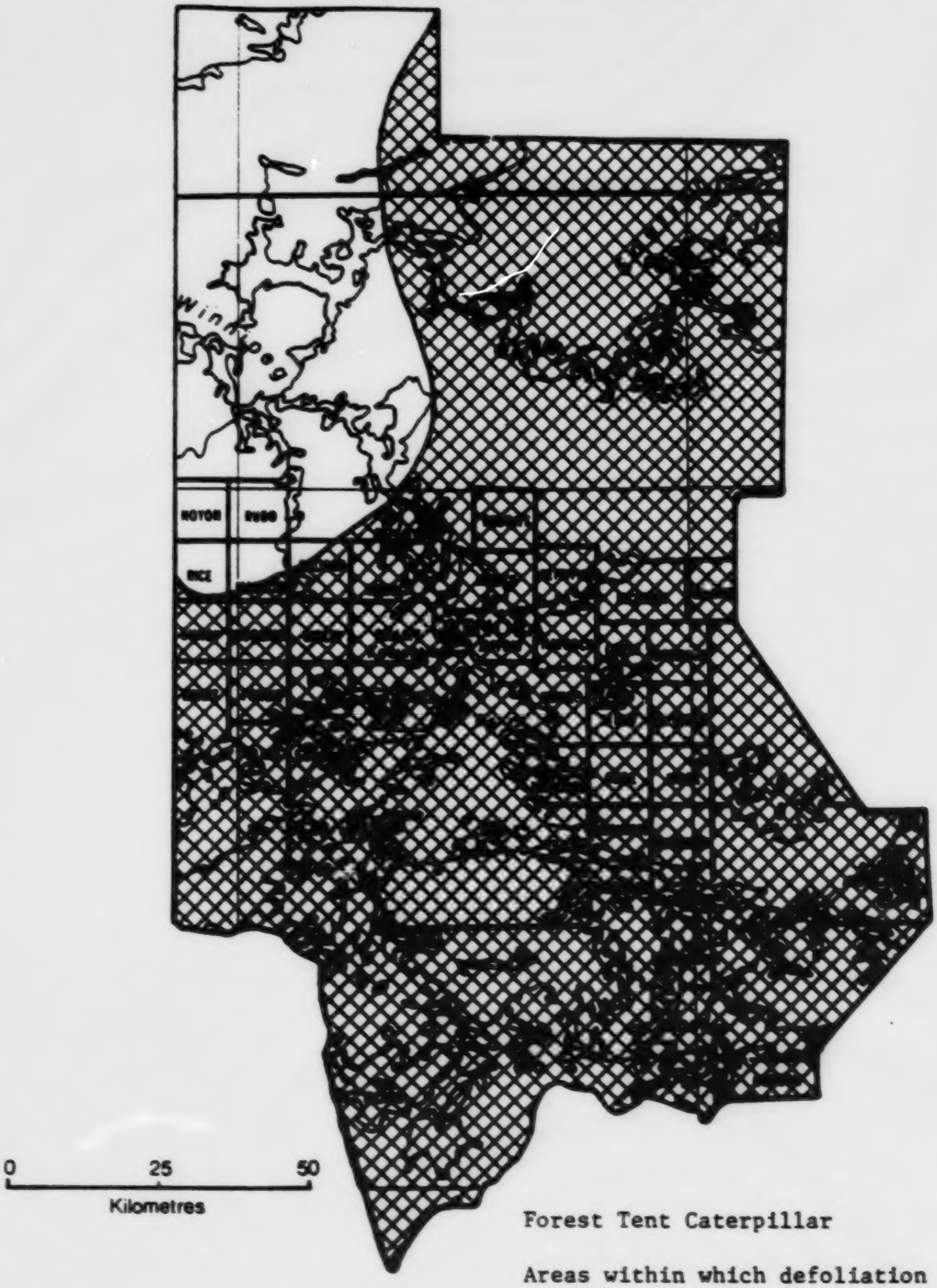
Areas within which defoliation occurred in 1951

LEGEND

Moderate-to-severe defoliation

● or ▨

KENORA DISTRICT


0
25
50
Kilometres

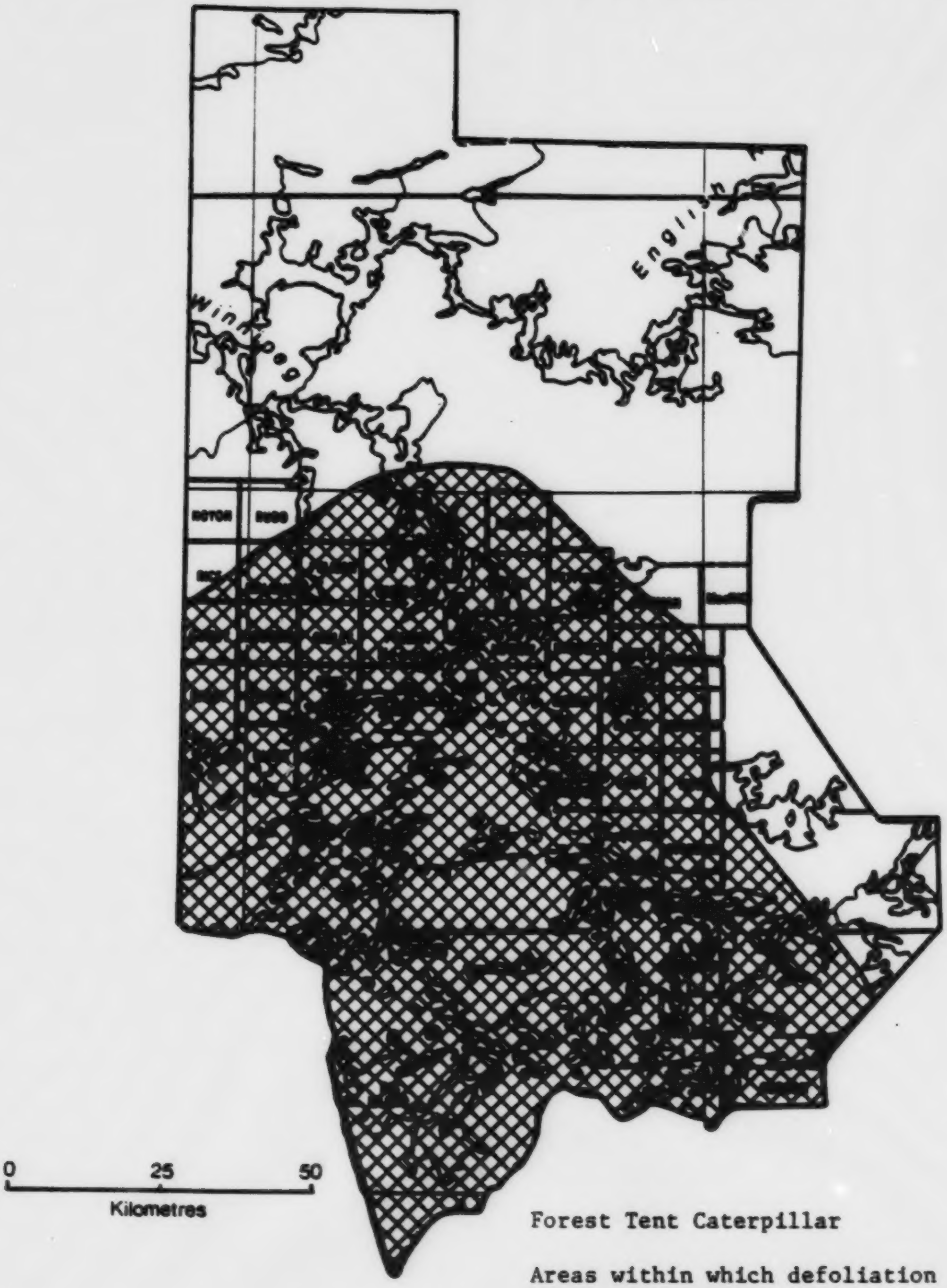
Forest Tent Caterpillar

Areas within which defoliation occurred in 1952

LEGEND

Moderate-to-severe defoliation ▨

KENORA DISTRICT


English
Winnipeg
0
25
50
Kilometres

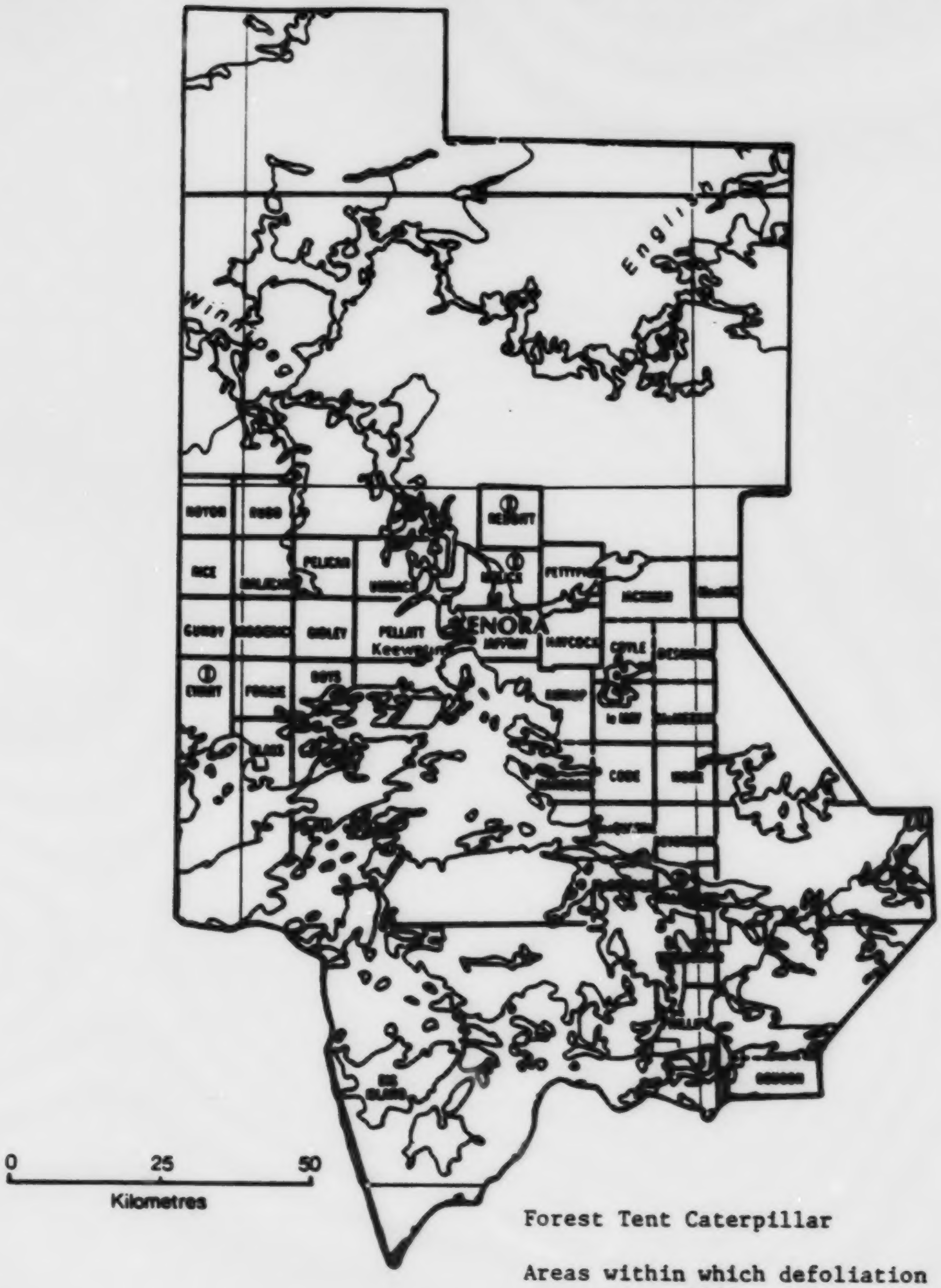
Forest Tent Caterpillar

Areas within which defoliation occurred in 1953

LEGEND

Moderate-to-severe defoliation ▨

KENORA DISTRICT


Winnipeg
English
RICE
PELICAN
GURDY
PELLATT
Keewatin
KENORA
JAFFRAY
HAYCOCK
COYLE
FORGIE
BOYS
CODE
0
25
50
Kilometres

Forest Tent Caterpillar

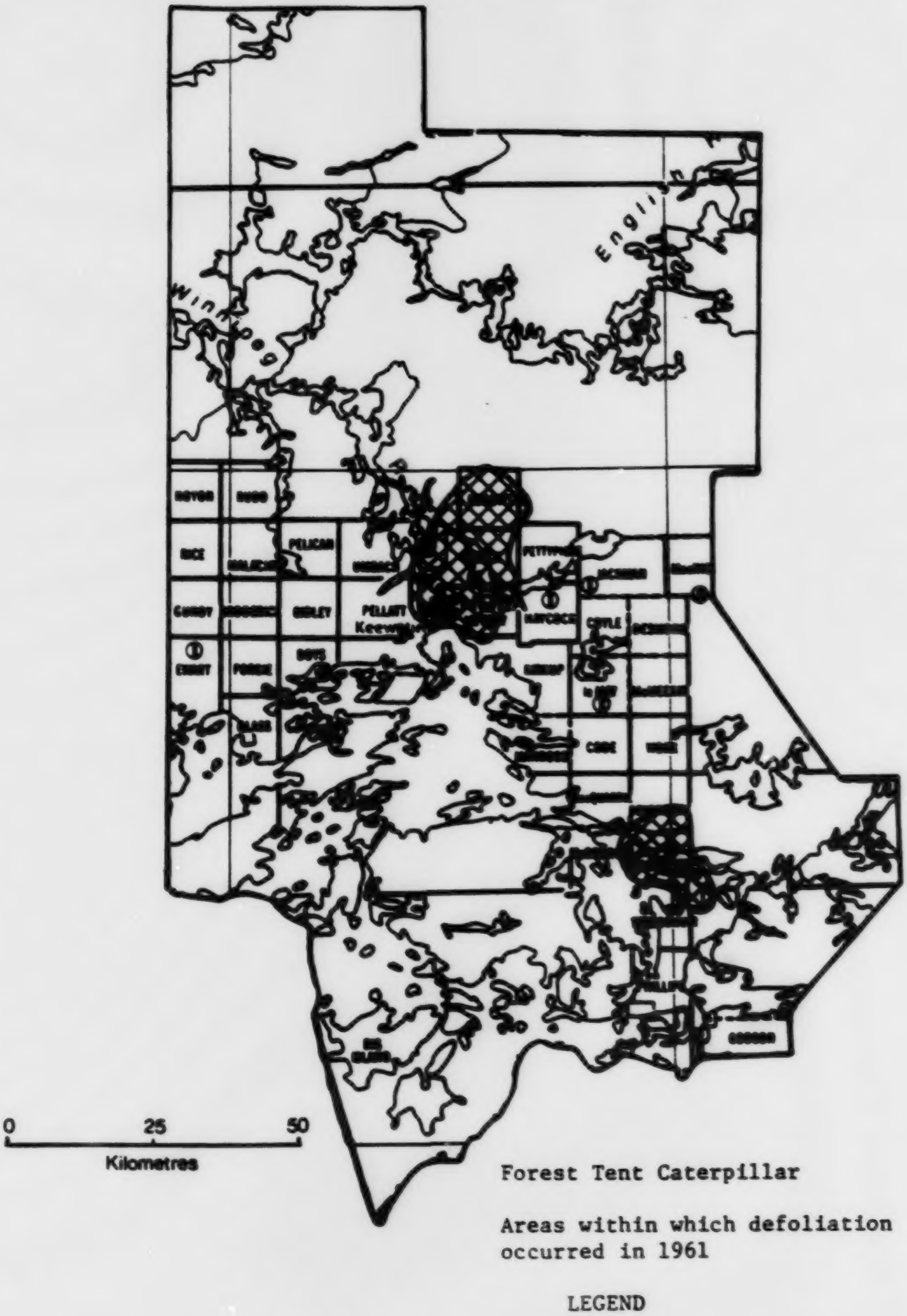
Areas within which defoliation occurred in 1960

LEGEND

Light defoliation ◑

Moderate-to-severe defoliation ●

KENORA DISTRICT


Winnipeg
English
Keewatin
0
25
50
Kilometres

Forest Tent Caterpillar

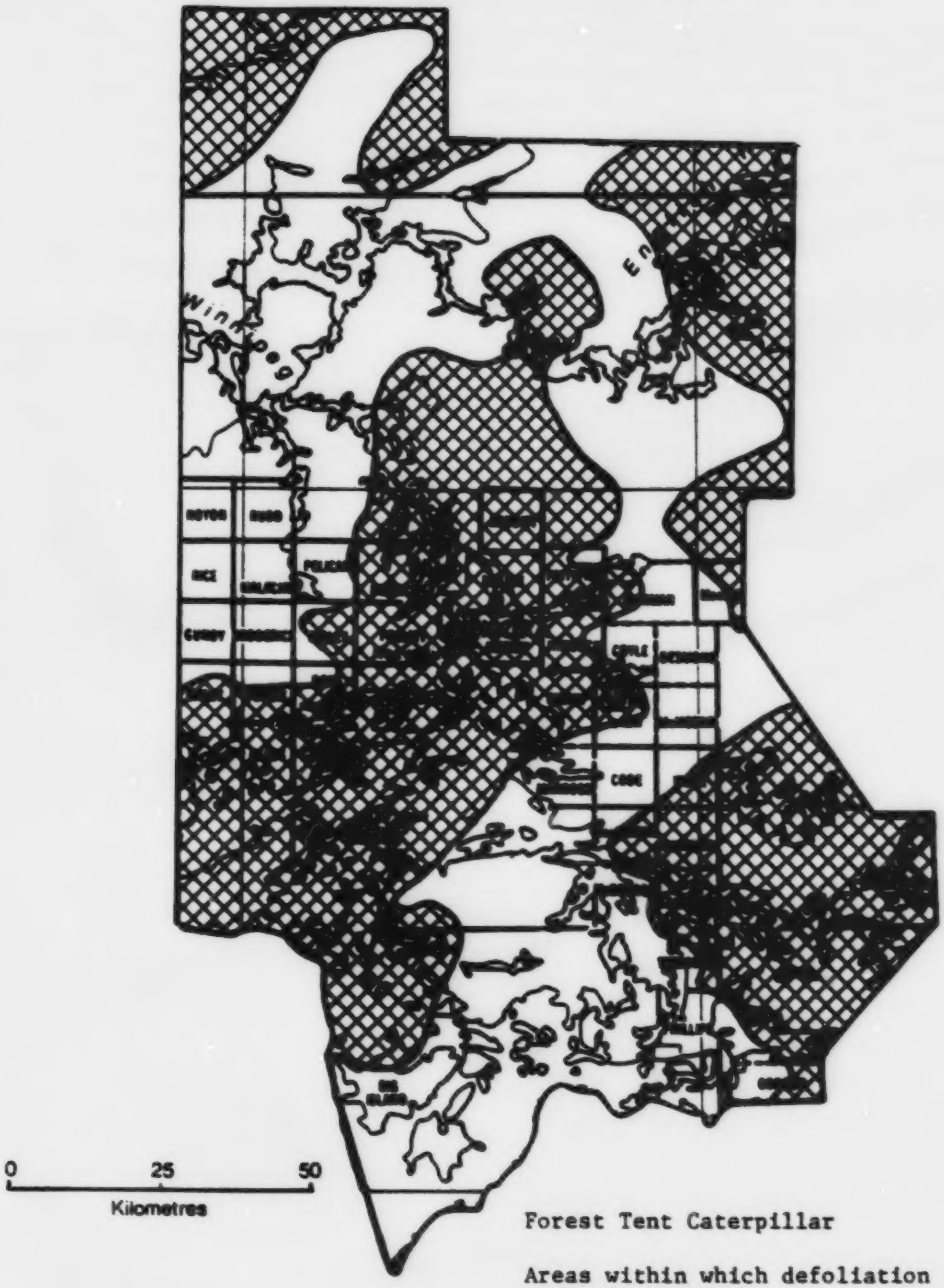
Areas within which defoliation occurred in 1961

LEGEND

Light defoliation ①

Moderate-to-severe defoliation ▨

KENORA DISTRICT


0
25
50
Kilometres

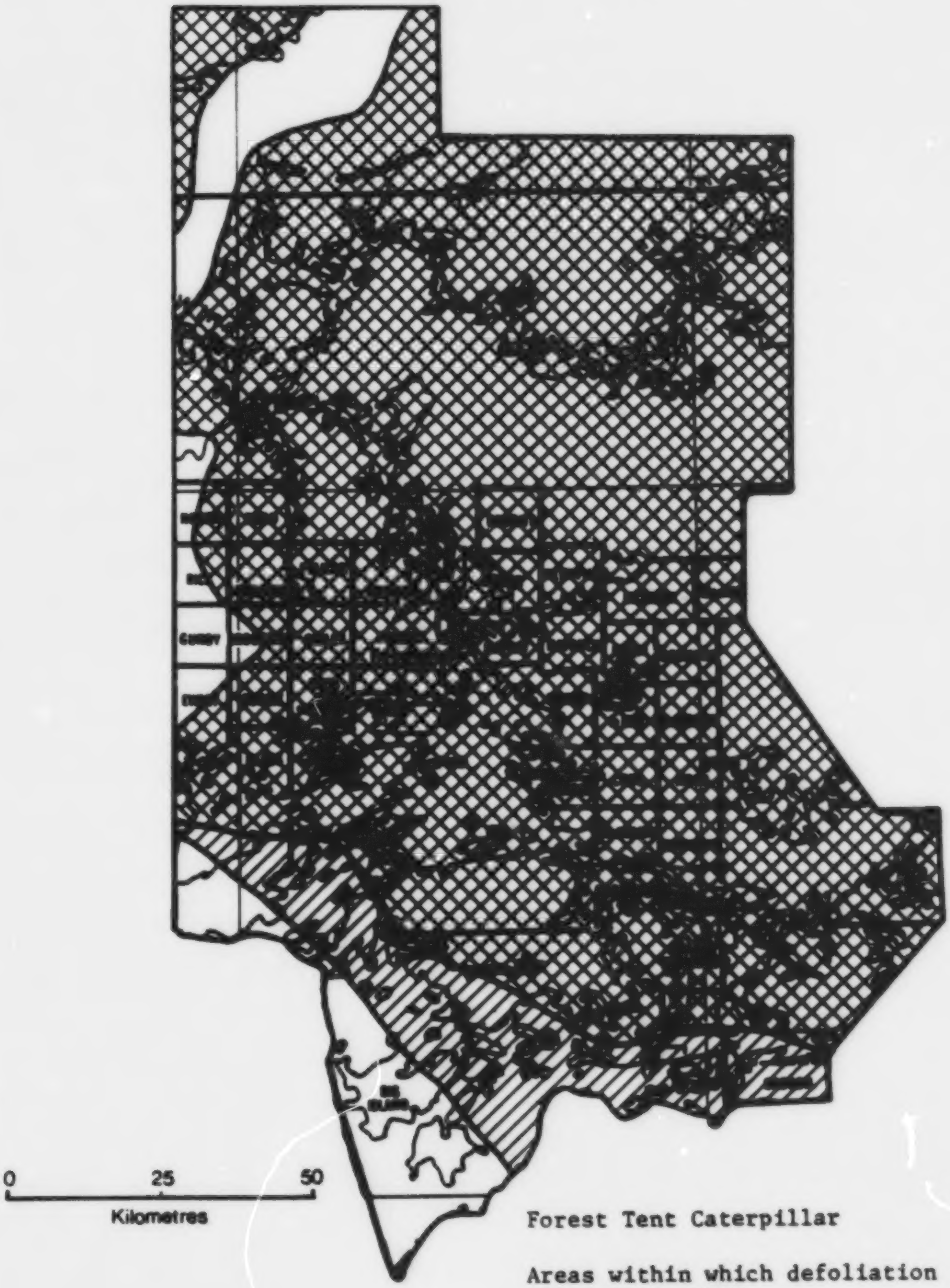
Forest Tent Caterpillar

Areas within which defoliation occurred in 1962

LEGEND

Moderate-to-severe defoliation ▨

KENORA DISTRICT


0
25
50
Kilometres

Forest Tent Caterpillar

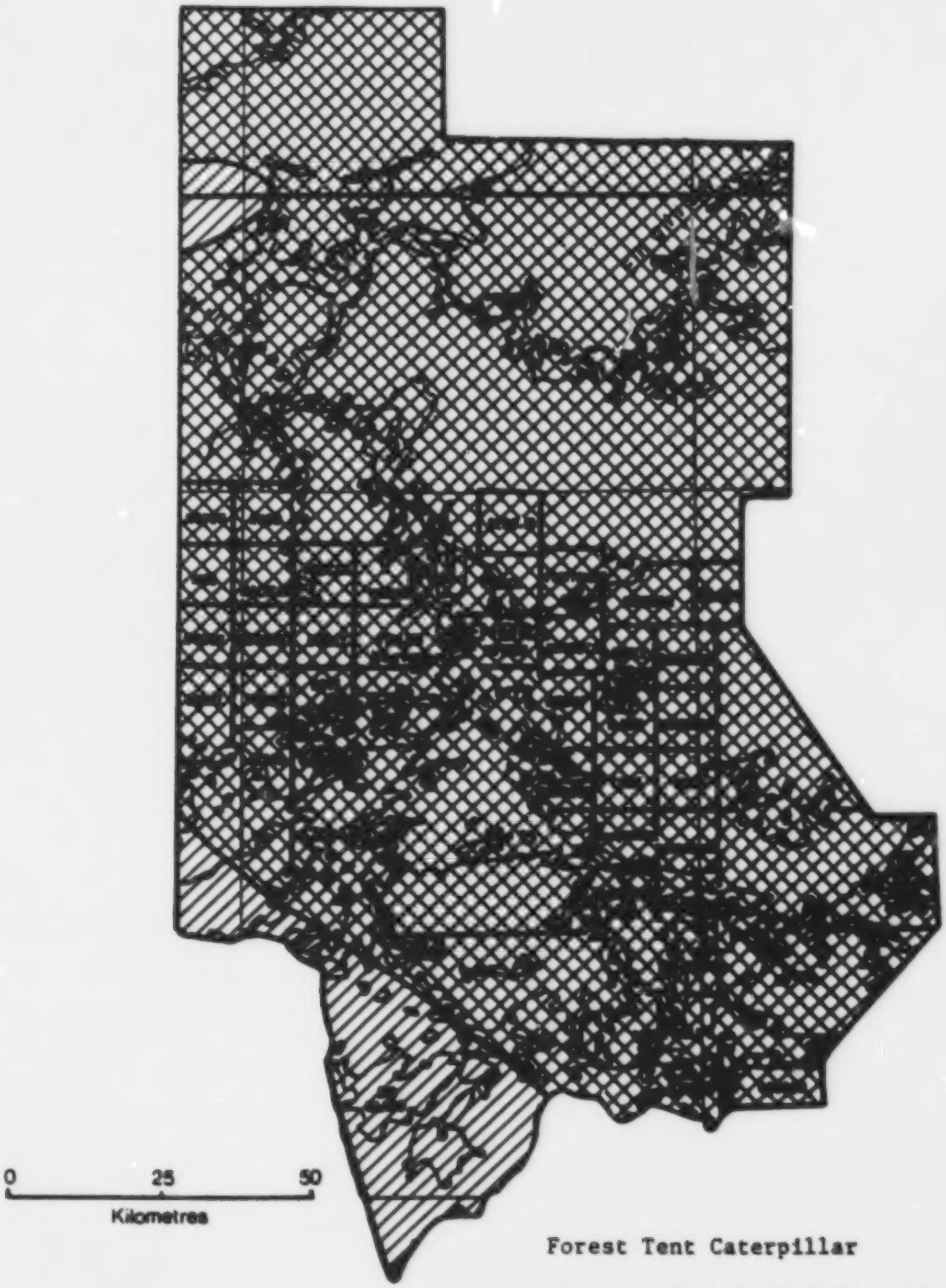
Areas within which defoliation occurred in 1963

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ▩

KENORA DISTRICT


0
25
50
Kilometres

Forest Tent Caterpillar

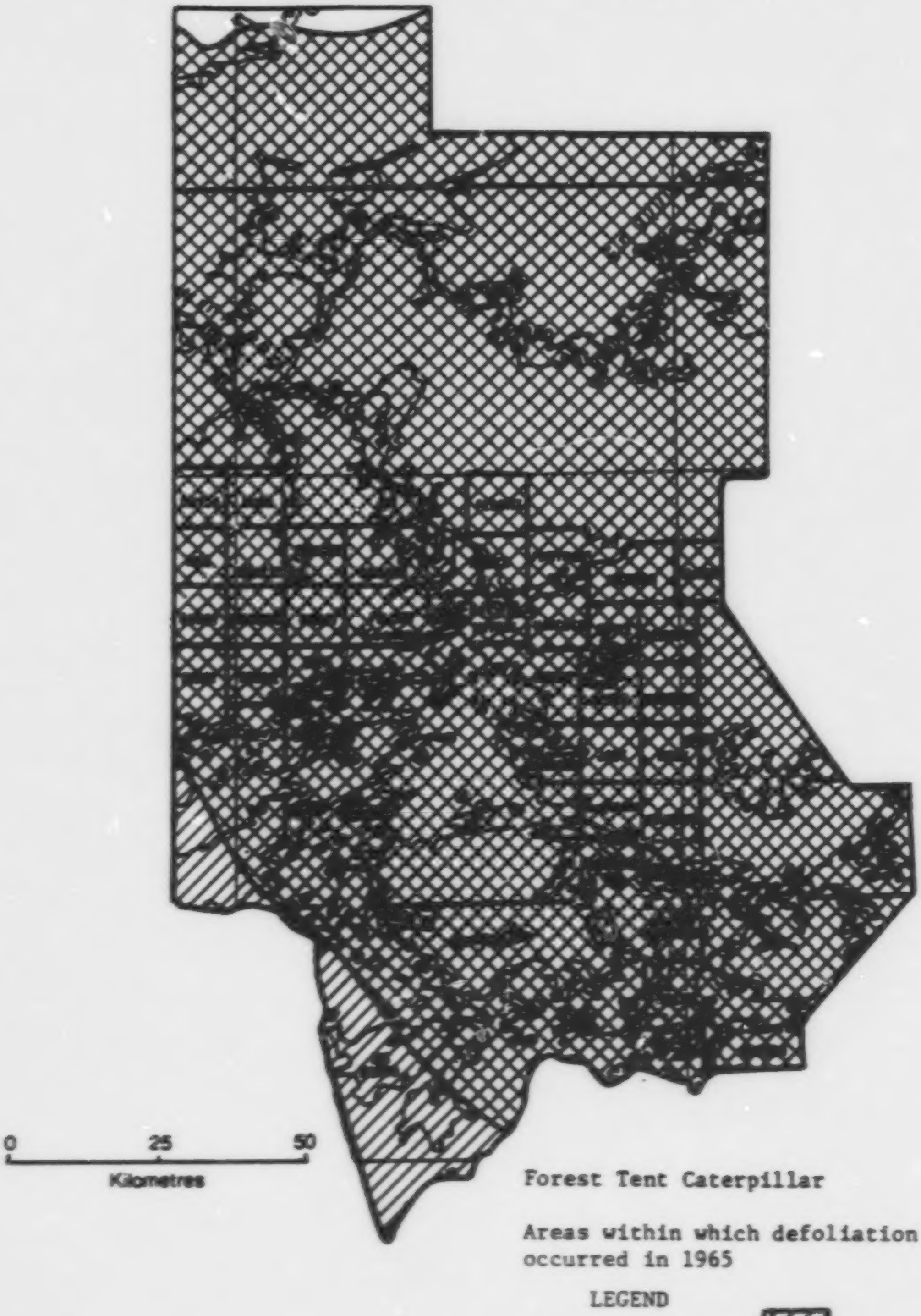
Areas within which defoliation occurred in 1964

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ▦

KENORA DISTRICT


0
25
50
Kilometres

Forest Tent Caterpillar

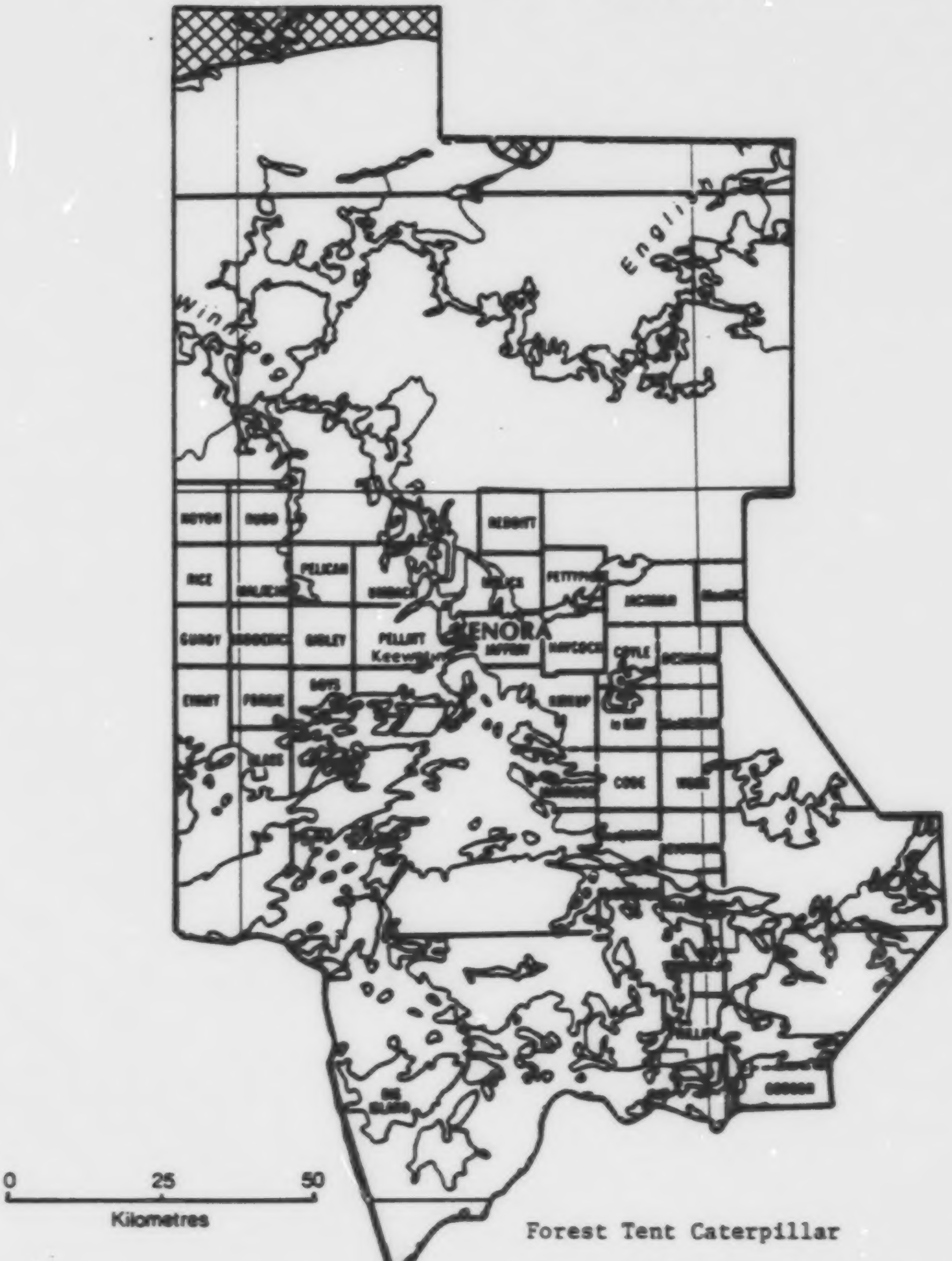
Areas within which defoliation occurred in 1965

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ▩

KENORA DISTRICT


English
Winnipeg
KENORA
Keewatin
0
25
50
Kilometres

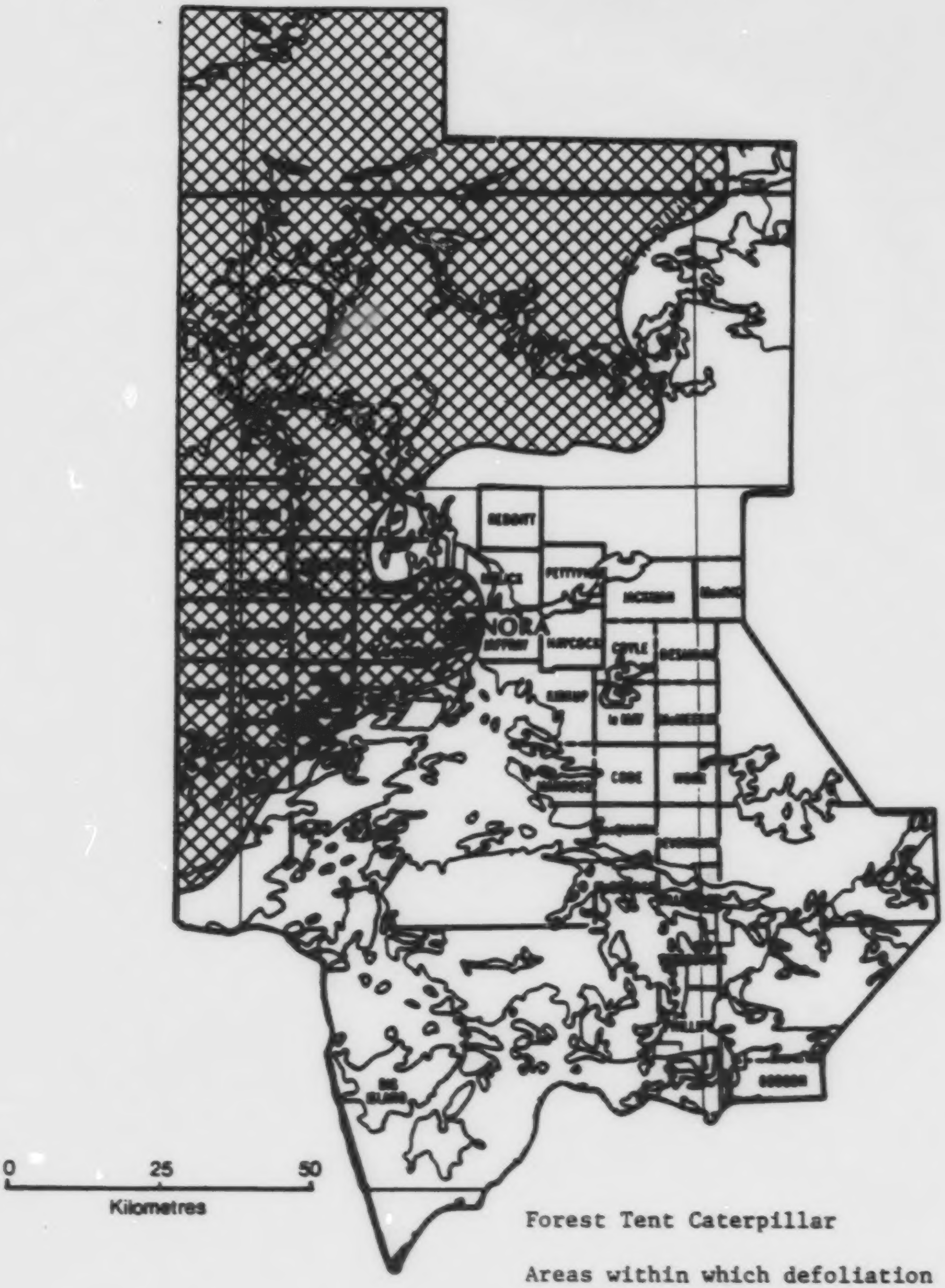
Forest Tent Caterpillar

Areas within which defoliation occurred in 1975

LEGEND

Moderate-to-severe defoliation ▨

KENORA DISTRICT


NORA
COYLE
CODE
0
25
50
Kilometres

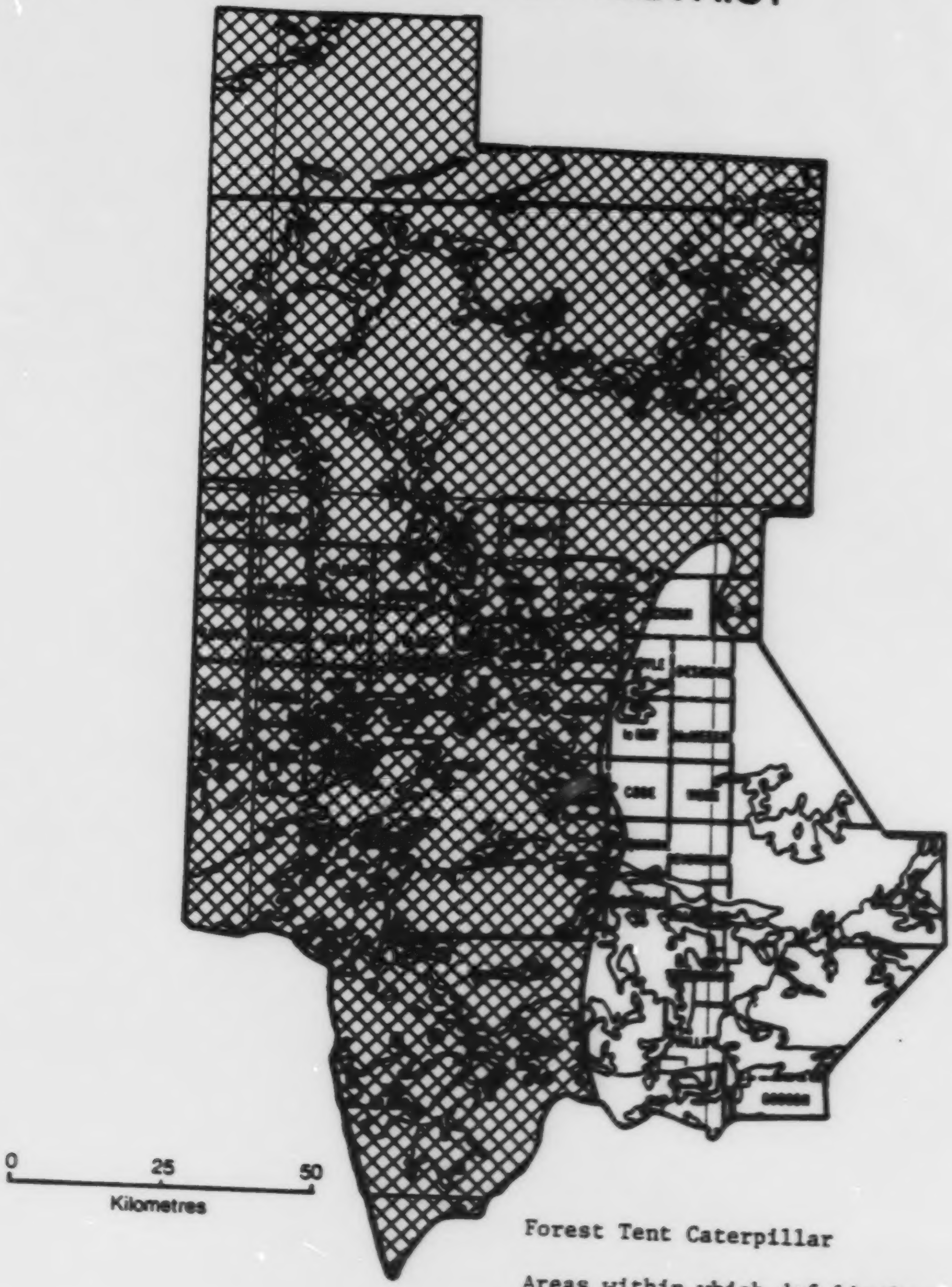
Forest Tent Caterpillar

Areas within which defoliation occurred in 1976

LEGEND

Moderate-to-severe defoliation ▨

KENORA DISTRICT


0
25
50
Kilometres

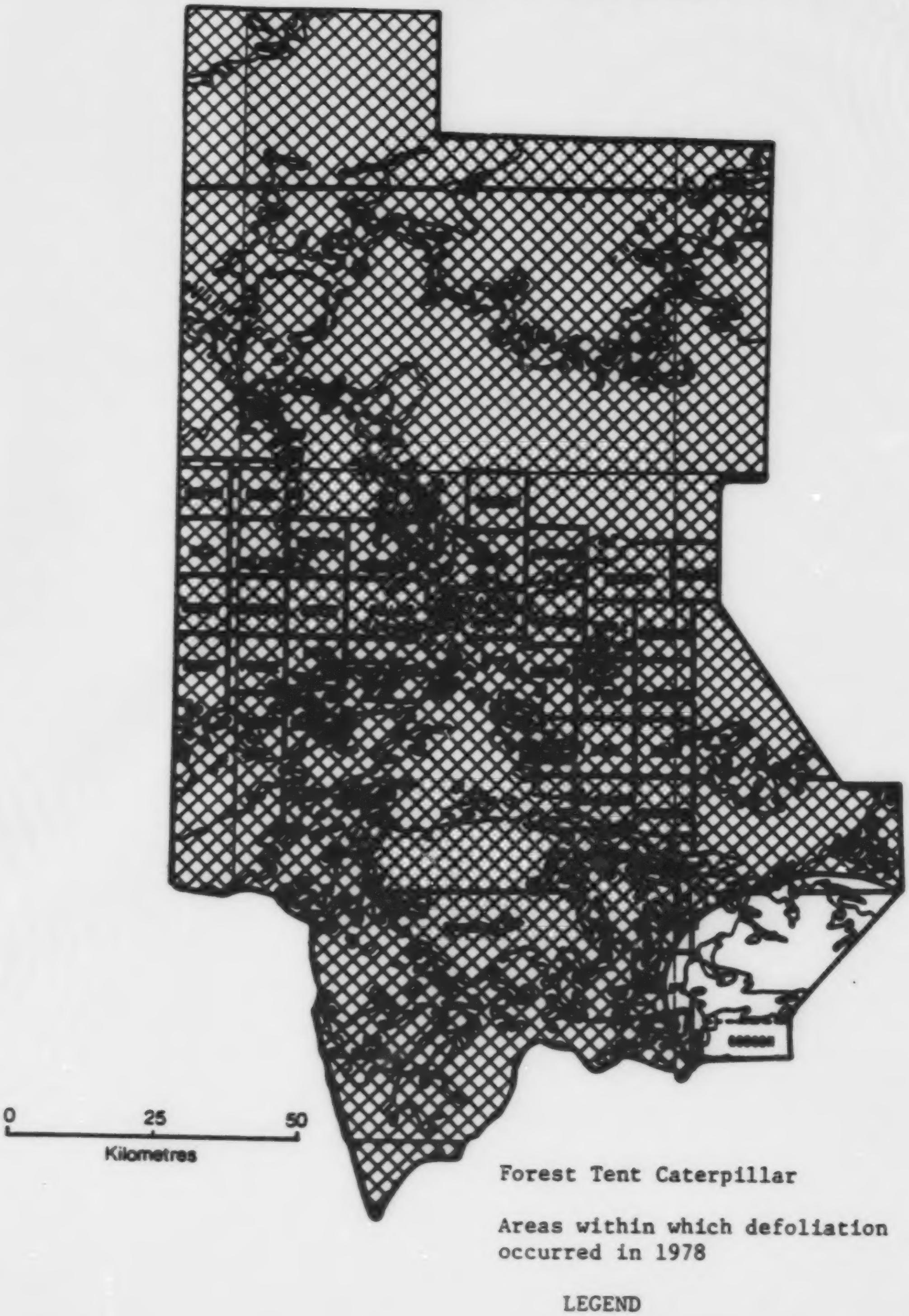
Forest Tent Caterpillar

Areas within which defoliation occurred in 1977

LEGEND

Moderate-to-severe defoliation ▨

KENORA DISTRICT


0
25
50
Kilometres

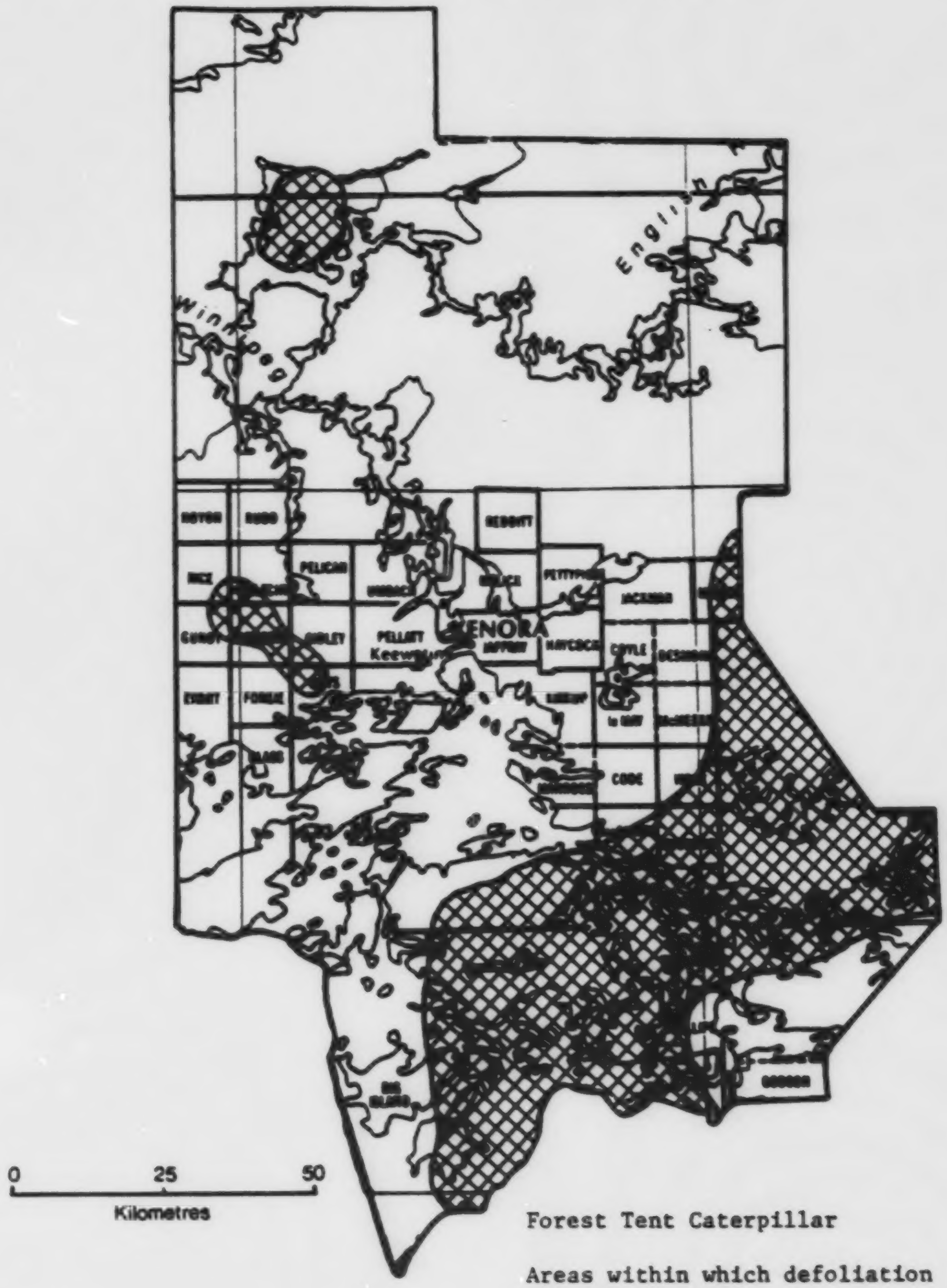
Forest Tent Caterpillar

Areas within which defoliation occurred in 1978

LEGEND

Moderate-to-severe defoliation ▨

KENORA DISTRICT


English
Winnipeg
NESBITT
PELICAN
JACKSON
KENORA
PELLATT
Keewatin
HAYCOCK
COYLE
CODE
0
25
50
Kilometres

Forest Tent Caterpillar

Areas within which defoliation occurred in 1979

LEGEND

Moderate-to-severe defoliation ▨

Balsam Fir Sawfly, *Neodiprion abietis* complex

Host(s): bF [Major]

Year	Remarks
1950-1955	not reported
1956	Medium-to-heavy infestations were found in the Lake of the Woods area and at Shoal Lake. Lower numbers were found in Ewart and Jaffray twps.
1957	Populations declined to low numbers.
1958	not reported
1959	trace level at Shoal Lake
1960	not reported
1961	Moderate-to-severe defoliation occurred on a small island in Shoal Lake.
1962	The infestation at Shoal Lake declined to light intensity.
1963	little change in population numbers
1964	trace populations
1965	light defoliation in Lake of the Woods area
1966	Moderate-to-severe defoliation occurred along Highway 71 between Longbow Corners and Nestor Falls; light defoliation occurred on Raspberry Island in Lake of the Woods.
1967	Moderate-to-severe defoliation occurred in Willingdon Twp; lightly defoliated trees were common along Highway 71 from Nestor Falls to Longbow Corners.
1968	trace populations in Devonshire, Forgie and Willingdon twps
1969	trace populations in Devonshire, Willingdon and Tweedsmuir twps
1970-1972	not reported
1973	trace populations at several locations
1974	lightly infested trees common throughout the district

(cont'd)

Balsam Fir Sawfly, *Neodiprion abietis* complex (concl.)

Host(s): bF [Major]

Year	Remarks
1975-1976	trace populations at several points
1977	trace populations at Crow and High lakes
1978-1980	not reported

Pine Sawflies, *Neodiprion nanulus nanulus* Schedl., *N. pratti banksianae* Roh., *N. swainei* Midd., and *N. virginianus* complex

Host(s): pine [Major]

Year		Remarks
1950-1951		not reported
1952	*N. pratti banksianae* *N. virginianus*	Trace populations were found on jack pine in Work Twp.
1954	*N. nanulus nanulus*	Medium-to-heavy infestations occurred on red pine at the north end of Sand Lake and on jack pine at Roughrock Lake Narrows.
	N. pratti banksianae	Medium-to-heavy infestations were found on islands in Lake of the Woods and light infestations were found at Sand Lake and Roughrock Lake Narrows.
	N. virginianus	High populations were found at Sand Lake and Roughrock Lake Narrows.
1955	*N. nanulus nanulus*	High numbers persisted at Sand Lake and at Long and Whitefish bays on Lake of the Woods.
	N. pratti banksianae	trace populations
	N. swainei	Several colonies were reported on jack pine at Roughrock Lake and at Sabaskong Bay on Lake of the Woods.

(cont'd)

Pine Sawflies, *Neodiprion nanulus nanulus* Schedl., *N. pratti banksianae* Roh., *N. swainei* Midd., and *N. virginianus* complex (cont'd)

Host(s): pine [Major]

Year		Remarks
1956	*N. nanulus nanulus*	light infestation on small red pine trees at Rowan Lake
	N. virginianus	heavy defoliation of small jack pine trees in Godson and Phillips twps; lightly defoliated trees in Tweedsmuir and Jaffray twps and at Sabaskong Bay
1957	*N. nanulus nanulus*	low numbers at Dryberry Lake
1958	*N. pratti banksianae*	one small area of light infestation on Sabaskong Bay, Lake of the Woods
1959	*N. pratti banksianae*	A small medium-to-heavy infestation occurred in Godson Twp.
1960	*N. pratti banksianae*	low numbers in Godson, Devonshire and McMeekin twps
	N. virginianus	A light infestation was found in a small stand in Haycock Twp.
1961		not reported
1962	*N. swainei*	A medium-to-heavy infestation was located on Painted Rock Island, Lake of the Woods.
	N. virginianus	low numbers on Lake of the Woods
1963		not reported
1964	*N. nanulus nanulus*	trace population near Nestor Falls
	N. pratti banksianae	low numbers in MacNicol, Kirkup, and Work twps and at Miles Bay on Lake of the Woods
1965	*N. nanulus nanulus*	low numbers near Nestor Falls

(cont'd)

Pine Sawflies, *Neodiprion nanulus nanulus* Schedl., *N. pratti banksianae* Roh., *N. swainei* Midd., and *N. virginianus* complex (cont'd)

Host(s): pine [Major]

Year		Remarks
1965	*N. swainei*	scattered colonies found in Sabasking Bay and Rabbit Point on Lake of the Woods
	N. virginianus	low numbers in MacNicol, Work and Kirkup twps
1966	*N. nanulus nanulus*	low numbers near Hawk and Link lakes
	N. swainei	Light infestations were found on islands in Astron Bay and Sabaskong Bay in Lake of the Woods.
	N. virginianus	scattered colonies in Melick and Tweedsmuir twps
1967	*N. nanulus nanulus*	trace populations in MacNicol and Phillips twps
	N. virginianus	trace populations in Kirkup and Tweedsmuir twps
1968	*N. nanulus nanulus*	trace populations in McMeekin, Phillips and Tweedsmuir twps
	N. virginianus	trace populations in Tweedsmuir Twp
1969	*N. virginianus*	trace population in Tweedsmuir and Desmond twps
1970	*N. virginianus*	trace population in Kirkup Twp
1971	*N. virginianus*	numerous colonies in jack pine stands near Sioux Narrows
1972		not reported
1973	*N. pratti banksianae*	low numbers near Sioux Narrows
1974		not reported

(cont'd)

Pine Sawflies, *Neodiprion nanulus nanulus* Schedl., *N. pratti banksianae* Roh., *N. swainei* Midd., and *N. virginianus* complex (concl.)

Host(s): pine [Major]

Year		Remarks
1975	*N. swainei*	Moderate-to-severe defoliation occurred on several small islands and shorelines in Lake of the Woods.
	N. virginianus	lightly defoliated jack pine at several locations on Lake of the Woods
1976		not reported
1977		scattered colonies on fringe trees at Richard Lake
1978		not reported
1979	*N. virginianus*	trace population in Boys Twp
1980	*N. virginianus*	scattered colonies in Godson Twp near Nestor Falls

Aspen Leafblotch Miner, *Phyllonorycter ontario* (Free.)

Host(s): tA [Major]

Year	Remarks
1950	Medium-to-heavy infestations were common throughout the district.
1951-1952	High populations were found wherever poplar stands had escaped defoliation by the forest tent caterpillar. Damage was particularly severe in the vicinity of Kenora and southward along Highway 71 to Nestor Falls.
1953	The infestation collapsed as a result of severe frost.
1954	not reported
1955-1957	trace populations
1958	A light infestation occurred in MacNicol Twp.

(cont'd)

Aspen Leafblotch Miner, *Phyllonorycter ontario* (Free.) (concl.)

Host(s): tA [Major]

Year	Remarks
1959-1960	trace populations
1961	Small areas of medium-to-heavy infestation occurred in Manross and Boys twps and at Hillock Lake.
1962	Medium-to-heavy infestations occurred in Pellatt and Desmond twps.
1963	One small area of medium-to-heavy infestation was reported near Rowdy Lake; low numbers were found elsewhere.
1964	trace populations
1965	lightly infested trees in Willingdon and Desmond twps
1966	Medium-to-heavy infestations were general in MacNicol, McMeekin and Melick twps.
1967	trace populations
1968	high numbers of mines at several locations
1969	Medium-to-heavy populations were observed in Redditt, Pellatt and McMeekin twps.
1970-1971	low populations
1972	Medium-to-heavy infestations occurred in several locations.
1973	low numbers only
1974	low populations
1975	light damage in Gundy Twp
1976-1978	low numbers at a few locations
1979	trace populations
1980	Medium-to-heavy infestations were reported at several locations throughout the district.

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.)

Host(s): spruce [Major]

Year	Remarks
1950-1954	not reported
1955-1959	Large numbers of sawflies were reported on small roadside trees along Highway 71, between Sioux Narrows and Longbow Corners, and along Highway 17, from Longbow Corners to Kenora.
1960	not reported
1961	Moderate-to-severe defoliation of open-grown trees occurred along Highway 71 between Nestor Falls and Sioux Narrows and in Melick Twp.
1962	Medium-to-heavy infestations were found on open-grown black and white spruce trees in Ewart and Pellatt twps. Light defoliation was common around Atikwa Lake.
1963	Moderate-to-severe defoliation was confined to a small area in Jaffray Twp.
1964-1965	trace populations
1966	Populations increased substantially and moderate-to-severe defoliation occurred on roadside and lakeshore trees at Minaki and Sioux Narrows and at Link and Hawk lakes.
1967	Medium-to-heavy infestations recurred in Pellatt Twp and at Sioux Narrows and Nestor Falls.
1968	Lightly defoliated trees were common throughout Pellatt, Willingdon and Kirkup twps.
1969-1974	trace populations
1975	not reported
1976	Moderate-to-severe damage occurred at Rushing River Provincial Park. Low populations were recorded along Hwy 17, west of Kenora.
1977-1978	Medium-to-heavy infestations recurred at Rushing River Provincial Park. Light damage occurred on ornamentals in the town of Kenora.
1979	Moderate-to-severe defoliation was reported in Jaffray, LeMay and Tweedsmuir twps.

(cont'd)

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.) (concl.)

Host(s): spruce [Major]

Year	Remarks
1980	Trees at Rushing River Provincial Park and at numerous points along Highway 17 west of Kenora sustained moderate-to-severe levels of defoliation.

White Pine Weevil, *Pissodes strobi* (Peck)

Host(s): pine, spruce [Major]

Year	Remarks
1950-1953	not reported
1954	trace populations in Work Twp
1955-1957	not reported
1958	Leader damage of 5% and 2% occurred on jack pine regeneration in Redditt and Willingdon twps, respectively.
1959-1960	not reported
1961	Leader damage of 8% and 15% occurred on jack pine regeneration in Willingdon and Redditt twps, respectively, and one location in Redditt Twp had 10% weevil damage on white pine.
1962	Populations declined to 3% in Redditt and Willingdon twps.
1963	5% leader damage on jack pine in Willingdon Twp and 4% on white pine in Redditt Twp was recorded
1964	Leader damage averaged 7% and 9%, respectively, in Redditt and Willingdon twps.
1965	Little change in population levels occurred; damage reached 6% and 9% in Redditt Twp and 11% in Willingdon Twp.
1966	Leader mortality was 13% and 2%, respectively, in Devonshire and McMeekin twps.
1967	Leader damage in Devonshire Twp was 1%; damage to 4% of trees occurred in McMeekin Twp.

(cont'd)

White Pine Weevil, *Pissodes strobi* (Peck) (concl.)

Host(s): pine spruce [Major]

Year	Remarks
1968	Weevil damage reached 3% in McMeekin Twp.
1969	Weeviling affected 3% of trees in McMeekin Twp and a jack pine plantation near Wade had 17% leader damage.
1970	trace leader damage in white pine plantations
1971-1973	not reported
1974	7% leader damage at one point (Access Rd. 314)
1975	Damage declined to 4% at the 1974 location.
1976-1978	not reported
1979	4% of jack pine regeneration suffered leader damage on Gundy Lake Road
1980	leader damage of 3% in Gundy Twp

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

Host(s): tL [Major]

Year	Remarks
1950	Moderate-to-severe defoliation, affecting up to 70% of the stand, was common throughout the eastern part of the district, from Redditt Twp in the north to Godson Twp in the south.
1951	Although populations were slightly lower than in 1950, moderate-to-severe defoliation was general throughout the central part of the district.
1952	Infestation intensities continued to decline and severe defoliation was confined to Jaffray Twp.
1953	Moderate-to-severe defoliation was general throughout the eastern part of the district; this reflected a substantial increase in population levels.
1954	Populations declined sharply and light defoliation was general throughout the eastern and central parts of the district.

(cont'd)

Larch Sawfly, *Pristiphora erichsonii* (Htg.) (cont'd)

Host(s): tL [Major]

Year	Remarks
1955	Medium-to-heavy infestation occurred in small stands in Haycock, Jackman and MacNicol twps; at other locations only light defoliation occurred.
1956	Mederate-to-severe defoliation occurred in small larch stands in Willingdon Twp and light defoliation was observed along Highway 71 south of Kenora.
1957	Medium-to-heavy infestations occurred in the northern part of the district and lightly defoliated trees were common along Highway 71 south of Kenora.
1958	Moderate-to-severe defoliation occurred in Ewart Twp and at several points in the central part of the district.
1959	Population levels were comparable to those found in 1958.
1960	Infestations were generally light with a pocket of medium-to-heavy infestation in Ewart Twp.
1961	Only light infestations were found.
1962	Lightly infested trees were observed in Devonshire and LeMay twps.
1963	trace populations
1964	One pocket of heavy infestation occurred in Willingdon Twp and pockets of light infestation were reported at several points elsewhere.
1965	Medium-to-heavy infestations occurred in Ewart, Haycock, and MacNicol twps and near Sioux Narrows.
1966	Moderate-to-severe defoliation was recorded in MacNicol, Kirkup and Devonshire twps and near Pistol Lake, along the Minaki Road.
1967	Medium-to-heavy infestations were present in Jaffray Twp and at several points between Highway 17 and Minaki and between Longbow Corners and Sioux Narrows.
1968	Populations declined; light infestations were found in the Kenora and Sioux Narrows areas.

(cont'd)

Larch Sawfly, *Pristiphora erichsonii* (Htg.) (concl.)

Host(s): tL [Major]

Year	Remarks
1969	one area of light infestation on European larch in Redditt Twp
1970	moderate-to-severe defoliation at several locations
1971	Infestations increased in size and intensity, particularly along the Jones Road, along Highways 17 and 71, and near the Canadian Pacific Railroad near Ingolf.
1972	Populations declined to low levels.
1973-1976	Only scattered colonies were observed.
1977-1980	trace populations

Other Noteworthy Insects

Fall Cankerworm, *Alsophila pometaria* (Harr.)

Host(s): deciduous [Major]

Year	Remarks
1950-1954	not reported
1955	heavy infestations in Kenora
1956	light infestations in Kenora
1957	High numbers recurred in Kenora.
1958-1980	not reported

Pine Spittlebug, *Aphrophora cribrata* (Wlk.)

Host(s): conifers [Major]

Year	Remarks
1950-1958	not reported
1959	low numbers throughout the district
1960-1965	not reported
1966	Numerous spittle masses were reported on jack pine regeneration in Kirkup Twp.
1967-1980	not reported

Uglynest Caterpillar, *Archips cerasivorana* (Fitch)

Host(s): tL [Major]

Year	Remarks
1950-1955	not reported
1956-1957	low numbers throughout the district
1958	high numbers in Pellatt and Umbach twps
1959	not reported
1960	high numbers in Jaffray and Umbach twps
1961-1965	Numerous tents were seen in Jaffray, Haycock, Pellatt, Forgie, Boys and McMeekin twps.
1966	not reported
1967	trace populations in Tweedsmuir Twp
1968-1971	not reported
1972	low numbers of tents north of Nestor Falls
1973-1980	not reported

Birch Sawfly, *Arge pectoralis* (Leach)

Host(s): birch [Major]

Year	Remarks
1950	lightly defoliated trees at several points on Lake of the Woods
1951-1959	not reported
1960	low numbers in the Kenora area
1961-1980	not reported

Jack Pine Resin Midge, *Cecidomyia resinicola* (O.S.)

Host(s): jP [Major]

Year	Remarks
1950-1960	not reported
1961	low numbers in Melick Twp
1962-1968	not reported
1969	Light and medium populations were reported in Haycock and Jaffray twps, respectively.
1970-1973	not reported
1974	low populations near Minaki
1975-1980	not reported

Larch Casebearer, *Coleophora laricella* (Hbn.)

Host(s): tL [Major]

Year	Remarks
1950-1970	not reported
1971	Trace populations were recorded at Sioux Narrows; it was the first record of this insect in the district.
1972-1973	no change in distribution
1974-1980	not reported

Jack Pine Tip Beetle, *Conophthorus banksianae* McP.

Host(s): jP [Major]

Year	Remarks
1950-1959	not reported
1960	trace populations
1961-1973	not reported
1974-1975	1% leader damage in the Minaki area
1976-1979	not reported
1980	common in young plantations in Gundy Twp

Yellowheaded Caterpillar, *Datana ministra* (Dru.)

Host(s): deciduous [Major]

Year	Remarks
1950-1957	not reported
1958	a single colony in Tweedsmuir Twp
1959-1960	not reported
1961	scattered colonies along roads in Melick Twp
1962	Moderate-to-severe defoliation of small white birch and willow trees occurred along Highway 17 near Kenora.
1963	lightly infested trees near Jones, north of Kenora
1964	not reported
1965	trace populations
1966	not reported
1967	several colonies near Kenora
1968-1980	not reported

Spruce Coneworm, *Dioryctria reniculelloides* Mut. & Mun.

Host(s): spruce, bF [Major]

Year	Remarks
1950-1959	not reported
1960	low numbers at seven locations
1961-1970	not reported
1971	common in low numbers throughout the district
1972-1980	not reported

Northern Pitch Twig Moth, *Petrova albicapitana* (Busck)

Host(s): [Major]

Year	Remarks
1950-1954	not reported
1955	Low numbers were reported at several locations on Lake of the Woods, along the Winnipeg River and in McMeekin Twp.
1956	moderate-to-heavy numbers in Willingdon Twp
1957-1958	low numbers general throughout the district
1959	not reported
1960-1964	trace populations
1965-1967	not reported
1968	trace populations
1969-1974	not reported
1975	trace populations
1976-1977	widely distributed throughout the district
1978-1980	not reported

Aspen Leafroller, *Pseudexentera oregonana* Wlshm.

Host(s): tA [Major]

Year	Remarks
1950-1973	not reported
1974	low numbers at several locations
1975-1976	not reported
1977	trace populations
1978	Small pockets of light defoliation were detected throughout the southern part of the district.
1979-1980	trace populations

DISEASES

Armillaria Root Rot, *Armillaria mellea* (Vahl:Fr.)Kummer

Host(s): jP. spruce [Major]

Year	Remarks
1950-1955	not reported
1956-1958	trace infections
1959-1977	not reported
1978	trace damage at Gundy Lake, Gundy Twp
1979	trace infections
1980	not reported

Dutch Elm Disease, *Ceratocystis ulmi* (Buism.) C. Moreau

Host(s): elm [Major]

Year	Remarks
1950-1979	not reported
1980	A sample taken from a deteriorating white elm tree in the town of Kenora proved to be infected by the pathogen; this marked the first record of the disease in the district.

Needle Rusts, *Chrysomyxa ledi* (Alb. & Schwein.) de Bary and
Chrysomyxa ledicola (Peck) Lagerh.

Host(s): spruce [Major]

Year	Remarks
1950	not reported
1951	prevalent in the district but caused little damage
1952-1953	not reported
1954	trace infections
1955	medium-to-heavy infection on black spruce in Desmond Twp

(cont'd)

Needle Rusts, *Chrysomyxa ledi* (Alb. & Schwein.) de Bary and
Chrysomyxa ledicola (Peck) Lagerh. (concl.)

Host(s): spruce [Major]

Year	Remarks
1956	not reported
1957	scattered trees heavily infected
1958	not reported
1959-1960	varying degrees of infection at many points
1961	not reported
1962	light infection at widely separated locations
1963	lightly infected trees at three locations in the district
1964	light infections at several locations
1965	medium-to-heavy infections in Ewart and MacNicol twps and along the Jones Road
1966	Light and medium-to-heavy infections occurred in Redvers and Pellatt twps.
1967	trace infections in Willingdon, Work and Redvers twps
1968	trace infections at many locations
1969	not reported
1970	high incidence in Devonshire Twp
1971	not reported
1972	trace infections near Sioux Narrows
1973	light infections at a few locations
1974-1980	trace infections

Ink Spot of Aspen, *Ciborinia whetzelii* (Seaver) Seaver

Host(s): tA [Major]

Year	Remarks
1950-1954	not reported
1955	Light foliar damage occurred near North Narrow Lake in Desmond Twp.
1956	not reported
1957-1959	trace levels at a few locations
1960-1961	not reported
1962	Medium-to-heavy foliar damage occurred at one location in Ewart Twp.
1963-1964	not reported
1965	light infection at three locations
1966-1969	not reported
1970-1972	trace infections
1973-1974	not reported
1975	trace infections
1976-1980	not reported

Pine Needle Rust, *Coleosporium asterum* (Dietel) Sydow

Host(s): pine [Major]

Year	Remarks
1950-1962	not reported
1963	light defoliation at one location near Kenora
1964-1965	trace infections
1966	medium-to-heavy infections in Devonshire Twp
1967-1969	not reported

(cont'd)

Pine Needle Rust, *Coleosporium asterum* (Dietel) Sydow (concl.)

Host(s): pine [Major]

Year	Remarks
1970-1972	trace infections throughout the district
1973	light infections on small trees north of Sioux Narrows
1974-1975	not reported
1976	trace infections level near Sioux Narrows
1977-1978	not reported
1979	10% of trees lightly infected in MacNicol Twp
1980	not reported

Eastern Gall Rust, *Cronartium quercuum* (Berk.) Miyabe ex Shirai f. sp. *banksianae*
Western Gall Rust, *Endocronartium harknessii* (J.P. Moore) Y. Hirats.

Host(s): pine [Major]

Year	Remarks
1950-1953	not reported
1954-1955	trace infections
1956	not reported
1957	trace infections
1958-1959	not reported
1960	trace infections
1961-1962	not reported
1963-1964	trace infections
1965	not reported
1966	Trace infections were prevalent throughout the district; medium-to-heavy infections occurred at one location near Keewatin.

(cont'd)

Eastern Gall Rust, *Cronartium quercuum* (Berk.) Miyabe ex Shirai f. sp. *banksianae*
Western Gall Rust, *Endocronartium harknessii* (J.P. Moore) Y. Hirats. (concl.)

Host(s): pine [Major]

Year	Remarks
1967-1968	Trace infections were common.
1969-1973	not reported
1974	In Redditt and Devonshire twps, respectively, 68% and 60% of the trees were affected.
1975	not reported
1976	Light damage was recorded at two locations west of Kenora.
1977	low infections common in the district
1978	not reported
1979	38% of trees affected on Jones Road at Silver Lake
1980	commonly observed throughout the district

White Pine Blister Rust, *Cronartium ribicola* J.C. Fischer

Host(s): wP [Major]

Year	Remarks
1950-1952	not reported
1953	light infections in most stands in the district
1954-1957	not reported
1958	Blister rust was common in the district; 40% incidence of infection occurred in one stand near Silver Lake.
1959	not reported
1960	High infection levels persisted at Silver Lake.
1961-1963	not reported
1964	widely distributed in pine stands throughout the district
1965	not reported
1966	widely distributed
1967	not reported
1968	varying levels of infection throughout the district
1969	moderate damage in white pine stands north of Nestor Falls
1970-1972	not reported
1973	10% incidence of infection recorded in Sioux Narrows area
1974	The incidence of infection ranged from 5% to 20% at scattered locations.
1975	The incidence of infection increased; new infection was observed at several points in the Lake of the Woods area.
1976	The incidence of infection increased on islands in the southern half of Lake of the Woods.
1977-1980	not reported

Tar Spot Needle Cast, *Davisomycella ampla* (J. Davis) Darker

Host(s): jP [Major]

Year	Remarks
1950-1965	not reported
1966	moderate-to-severe damage in Tweedsmuir Twp
1967-1971	not reported
1972	Moderate-to-severe damage occurred in many stands throughout the district.
1973	A marked increase in the incidence of needle cast was recorded; however, only light damage could be found.
1974-1975	not reported
1976	light damage at scattered points
1977-1980	not reported

Hypoxylon Canker, *Hypoxylon mammatum* (Wahlenb.) J. Miller

Host(s): poplar [Major]

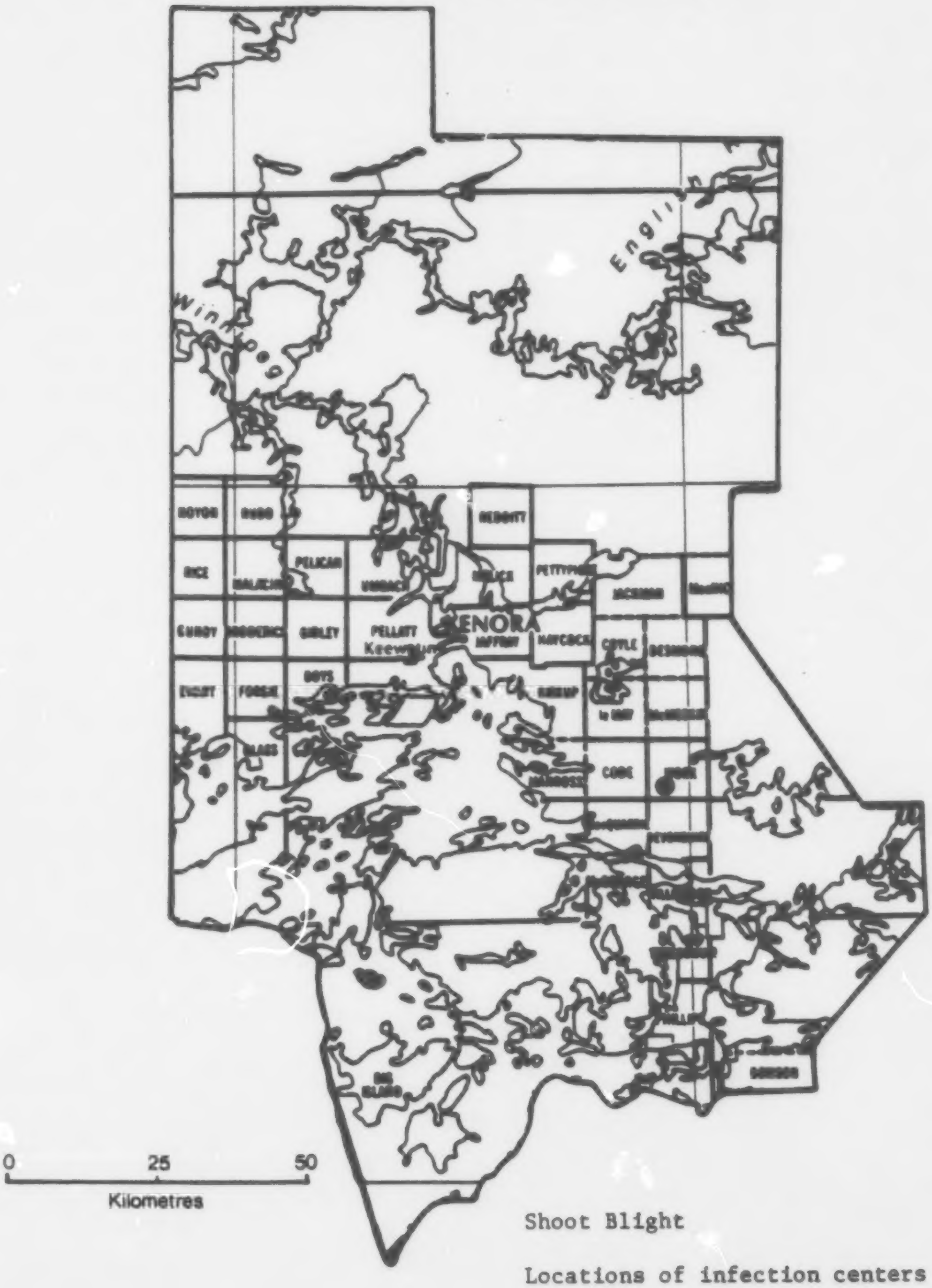
Year	Remarks
1950-1952	not reported
1953	trace infections at several locations
1954-1955	found commonly throughout the district
1956-1963	not reported
1964-1969	common in aspen stands
1970-1974	not reported
1975-1980	common throughout the district

Shoot Blight, *Sirococcus conigenus* (DC.) P. Cannon & Minter

Host(s): pine [Major]

Year	Remarks
1950-1972	not reported
1973	This year marked the first record of this pathogen in the district; light damage was observed at two points in the southern part of the district (see map, page 79).
1974	Three new infection centers were found in the northern half of the district. Light damage was evident at each point.
1975	Light damage to current shoots occurred at each infection center.
1976	A new infection center was found in planted red pine trees east of Kenora.
1977	not reported
1978	A new infection center was discovered at Rushing River Provincial Park.
1979-1980	not reported

KENORA DISTRICT


Winnipeg
English
KENORA
Keewatin
PELICAN
GIRLEY
PELLATT
JAFFRAY
JACKSON
FORGIE
BOYS
COOK
RICE
0
25
50
Kilometres

Shoot Blight

Locations of infection centers
in 1973

LEGEND

Infection centers ●

Shoot Blight, *Venturia macularis* (Fr.) E. Müller & v. Arx

Host(s): tA [Major]

Year	Remarks
1950-1952	not reported
1953	trace infection, Redditt Twp
1954	trace infections
1955	found commonly on small aspen throughout the district
1956	not reported
1957-1959	commonly observed throughout the district
1960-1961	not reported
1962	Medium-to-heavy infection occurred at two locations in the district.
1963	Trace infections were common on aspen regeneration.
1964	32% of trees affected at Sabaskong Bay, Lake of the Woods
1965	On average, 33% of leaders were affected at three locations.
1966-1970	trace and light infections
1971	not reported
1972	trace and light infections
1973-1974	not reported
1975-1976	Light infections were common throughout the district.
1977	Leader mortality of 77% occurred on aspen regeneration along Dryberry Lake Road.
1978	light infections
1979	10% leader mortality at Hillock Lake
1980	not reported

Other Noteworthy Diseases

Eastern Dwarf Mistletoe, *Arceuthobium pusillum* Peck

Host(s): spruce [Major]

Year	Remarks
1950-1952	not reported
1953	A low incidence of mistletoe infection was common in black spruce stands in lowlying areas throughout the district.
1954	light damage observed in Godson Twp
1955-1966	not reported
1967	Light tree mortality was recorded in Jaffray Twp.
1968	High levels of infection occurred at scattered points in Jaffray and Devonshire twps and in the Stewart Lake area.
1969	Quantitative sampling revealed 57% and 61% incidence of infection in sample areas in Jaffray and McMeekin twps, respectively.
1970-1972	not reported
1973	widespread at a low level of infection throughout the district
1974-1980	not reported

Shoot Blight, *Pollaccia elegans* Servit

Host(s): bPo [Minor]

Year	Remarks
1950-1958	not reported
1959-1960	Light damage was recorded at Miles Bay on Lake of the Woods.
1961	low infection levels at many points in the district
1962-1964	not reported
1965	Light damage occurred at widely separated points.
1966	not reported
1967	light damage at scattered locations
1968-1970	not reported
1971	low incidence of damage common in the district
1972-1980	not reported

Fireweed Rust, *Pucciniastrum epilobii* Otth

Host(s): bF [Minor]

Year	Remarks
1950-1962	not reported
1963	light infections at scattered points
1964-1965	one point of light infection
1966	A small area of medium-to-heavy infection was reported in Work Twp, and light damage occurred on Rabbit Point Island in Lake of the Woods.
1967	In Willingdon Twp, 41% of the shoots were infected.
1968	light infections
1969	not reported

(cont'd)

Fireweed Rust, *Pucciniastrum epilobii* Otth (concl.)

Host(s): bF [Minor]

Year	Remarks
1970-1971	trace infections
1972	not reported
1973	light levels of infection near Sioux Narrows
1974	light infections at several points in Lake of the Woods
1975-1980	not reported

ABIOTIC DAMAGE

Drought

Year	Remarks
1950-1964	not reported
1965	Pines were moderately to severely damaged on islands and in shoreline stands throughout an area of approximately 1,900 km^2 in Lake of the Woods. Mortality in affected jack pine stands ranged from 22% to 51%.
1966-1969	not reported
1970	White birch regeneration growing on shallow or high, rocky sites was seriously damaged at many points in the district.
1971	Serious damage to white birch regeneration growing on high, rocky sites recurred at many points in the district.
1972-1973	not reported
1974	White birch and jack pine regeneration growing on exposed islands in Lake of the Woods and on high, rocky sites at many points elsewhere in the district were moderately to severely damaged.
1975-1980	not reported

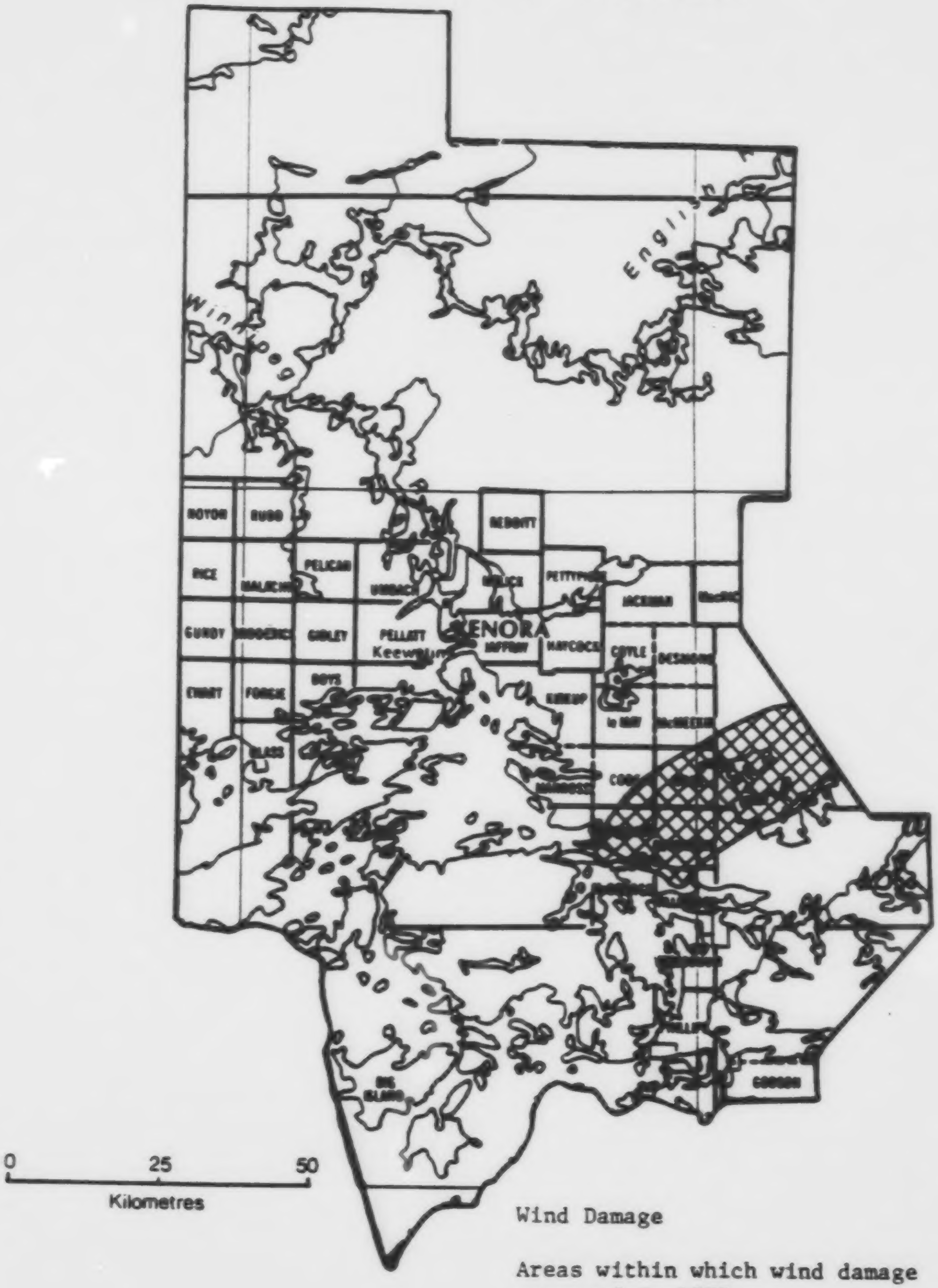
Frost

Year	Remarks
1950-1952	not reported
1953	Moderate-to-severe foliar damage on trembling aspen and light damage on larch occurred in many stands throughout the district.
1954-1963	not reported
1964	Pockets of moderate-to-severe damage occurred in Redditt Twp and along the Jones Road. The most serious injury occurred to balsam fir and white spruce; light damage was observed on trembling aspen as well.
1965	Moderate-to-severe damage to current shoots of balsam fir and white spruce was evident at many locations. Open-grown and fringe trees suffered the most injury.
1966-1977	not reported
1978	Moderate-to severe damage to the current foliage of balsam fir and spruce was evident on open sites and on fringes of stands.
1979-1980	not reported

Wind

Year	Remarks
1950-1972	not reported
1973	Moderate-to-severe damage occurred to all tree species in an area of approximately 240 km^2 in a strip extending from the southeastern part of Lake of the Woods to the eastern district boundary in the Dryberry Lake area (see map, page 89).
1974-1980	not reported

KENORA DISTRICT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Winn
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PELICAN
RICE
GURDY
GIDLEY
PELLATT
Keewatin
KENORA
JAFFRAY
HAYCOCK
MELICK
PETTYPIECE
JACKMAN
COYLE
DESMOND
EWART
FORGIE
BOYS
GLASS
BIG ISLAND
0
25
50
Kilometres

Wind Damage

Areas within which wind damage occurred in 1973

LEGEND

Moderate-to-severe damage ▨

Winter Drying

Year	Remarks
1950-1964	not reported
1965	Foliar damage occurred in widely scattered white pine and jack pine plantations. The highest incidence of damage was evident on southerly slopes and in open areas.
1966	not reported
1967	Moderate-to-severe damage was recorded in white pine and red pine plantations in Jaffray and Willingdon twps.
1968-1969	not reported
1970	Surveys along the Jones Road revealed that up to 17.5% of young red pine and white pine trees were damaged in the area.
1971-1976	Moderate-to-severe foliar damage was evident on young red pine and balsam fir trees on open sites at widely scattered points.
1977-1980	not reported

APPENDICES

APPENDIX A

DECIDUOUS HOST

Common Name	Scientific Name	Abbreviations
Alder	*Alnus* spp.	Al
Apple	*Malus* spp.	Ap
Ash, black	*Fraxinus nigra* Marsh.	As
Aspen, largetooth	*Populus grandidentata* Michx.	lA
trembling	*tremuloides* Michx.	tA
Basswood	*Tilia* spp.	Ba
Beech	*Fagus grandifolia* Ehrh.	Be
Birch, white	*Betula papyrifera* Marsh.	wB
yellow	*alleghaniensis* Britt.	yB
Butternut	*Juglans cinerea* L.	Bu
Cherry, eastern choke	*Prunus virginiana* L.	eaCh
pin	*pensylvanica* L.f.	pCh
Elm, white	*Ulmus americana* L.	wE
Horse-chestnut	*Aesculus hippocastanum* L.	hChe
Ironwood	*Ostrya* spp.	I
Maple, Manitoba	*Acer negundo* L.	mM
red	*rubrum* L.	rM
sugar	*saccharum* Marsh.	sM
Mountain-ash, American	*Sorbus americana* Marsh.	aMo
Oak, bur	*Quercus macrocarpa* Michx.	bO
red	*rubra* L.	rM
Poplar, balsam	*Populus balsamifera* L.	bPo
Carolina	X *canadensis* Moench	cPo
Lombardy	*nigra* var. *italica* Muenchh.	lPo
silver	*alba* L.	sPo
Willow	*Salix* spp.	W

APPENDIX B

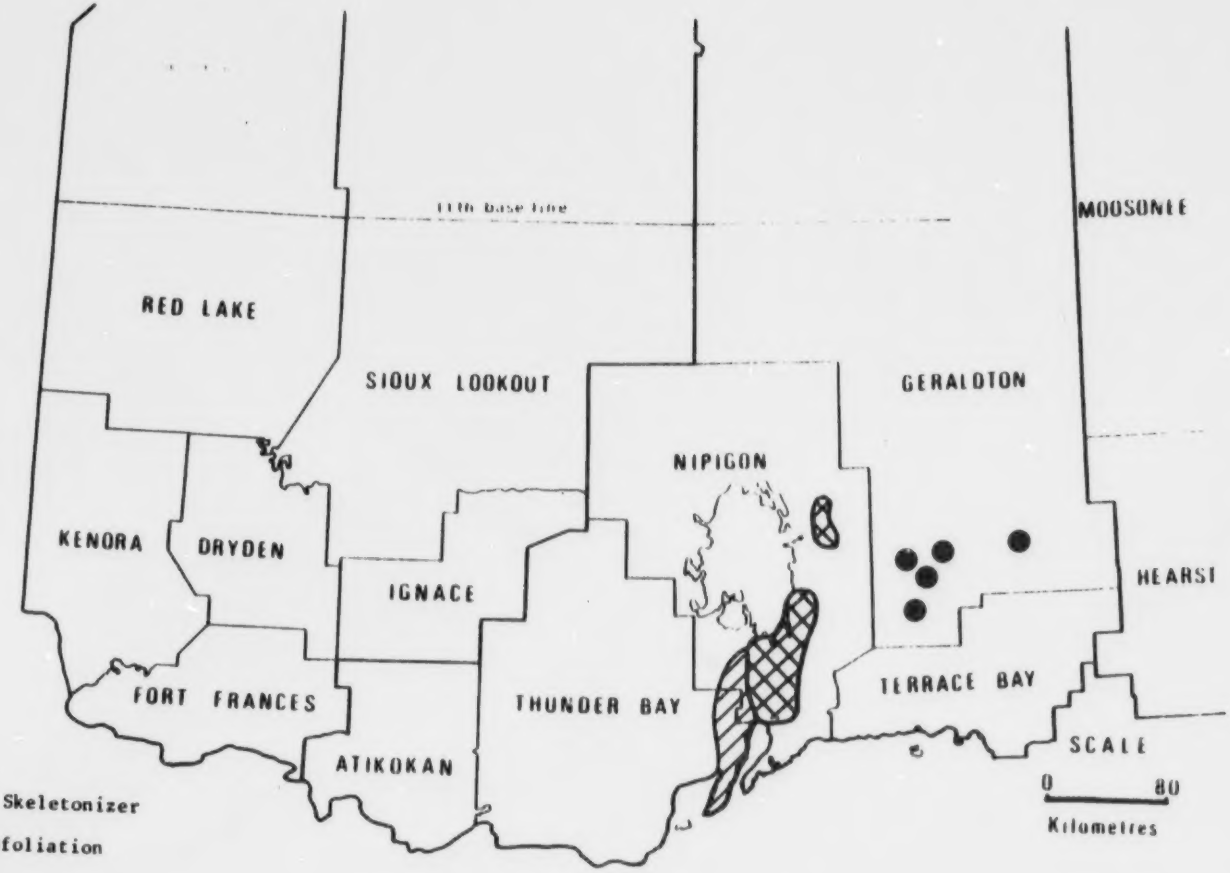
CONIFEROUS HOST

Common Name	Scientific Name	Abbreviations
Cedar, eastern white	*Thuja occidentalis* L.	eC
Fir, balsam	*Abies balsamea* (L.) Mill.	bF
Larch	*Larix laricina* (Du Roi) K. Koch	tL
Pine, Austrian	*Pinus nigra* Arn.	aP
eastern white	*strobus* L.	wP
jack	*banksiana* Lamb.	jP
mugho	*mugo* Turra var. *mughus* Zenari	mP
red	*resinosa* Ait.	rP
Scots	*sylvestris* L.	scP
Spruce, black	*Picea mariana* (Mill.) B.S.P.	bS
Colorado	*pungens* Engelm.	colS
Norway	*abies* (L.) Karst.	nS
red	*rubens* Sarg.	rS
white	*glauca* (Moench) Voss	wS

APPENDIX C

MAPS-NORTHWESTERN ONTARIO

NORTHWESTERN ONTARIO


11th base line
MOOSONEE
RED LAKE
SIOUX LOOKOUT
GERALDTON
NIPIGON
KENORA
DRYDEN
IGNACE
HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

Birch Skeletonizer

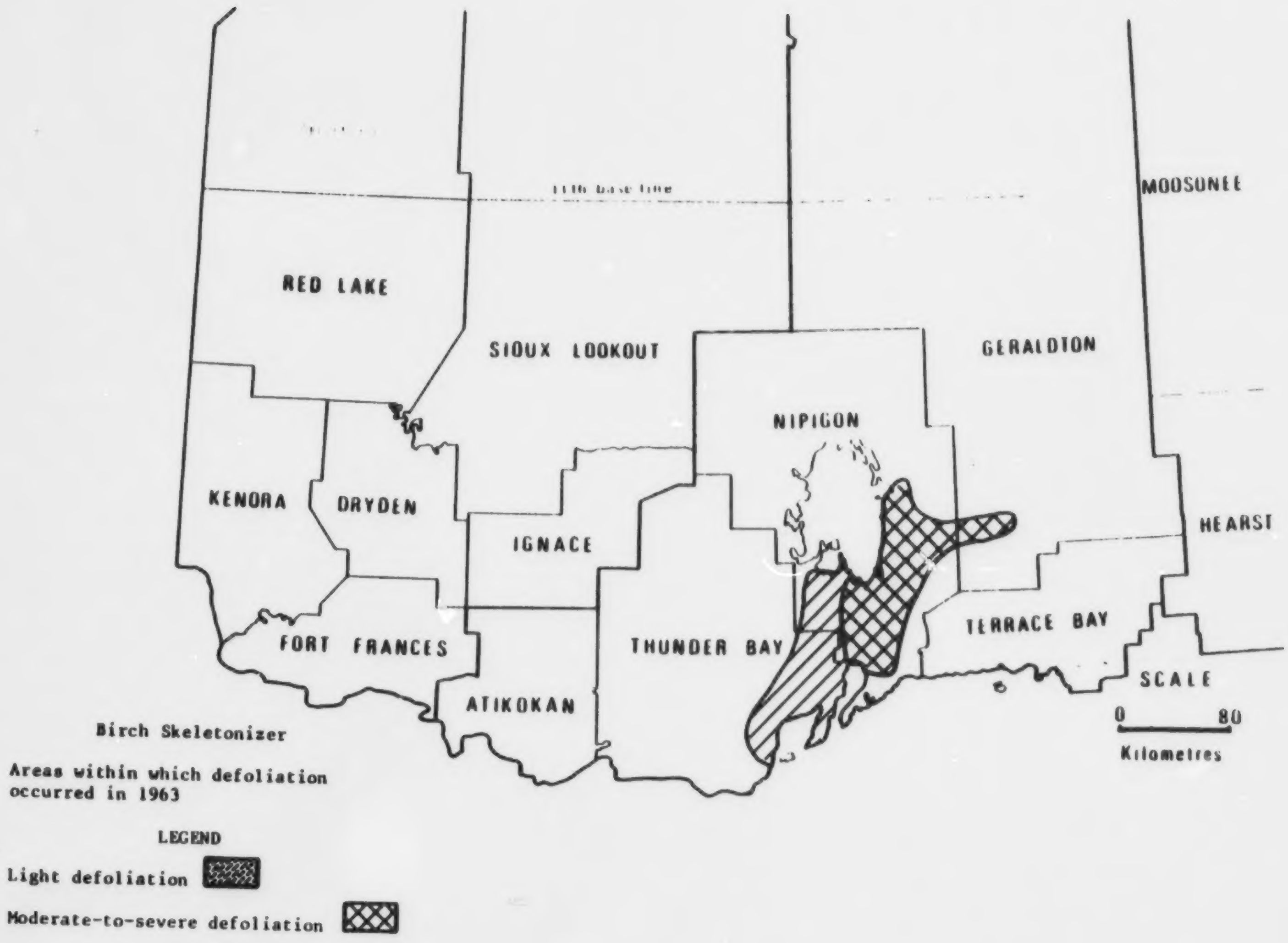
Areas within which defoliation
occurred in 1962

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ● or ▩

NORTHWESTERN ONTARIO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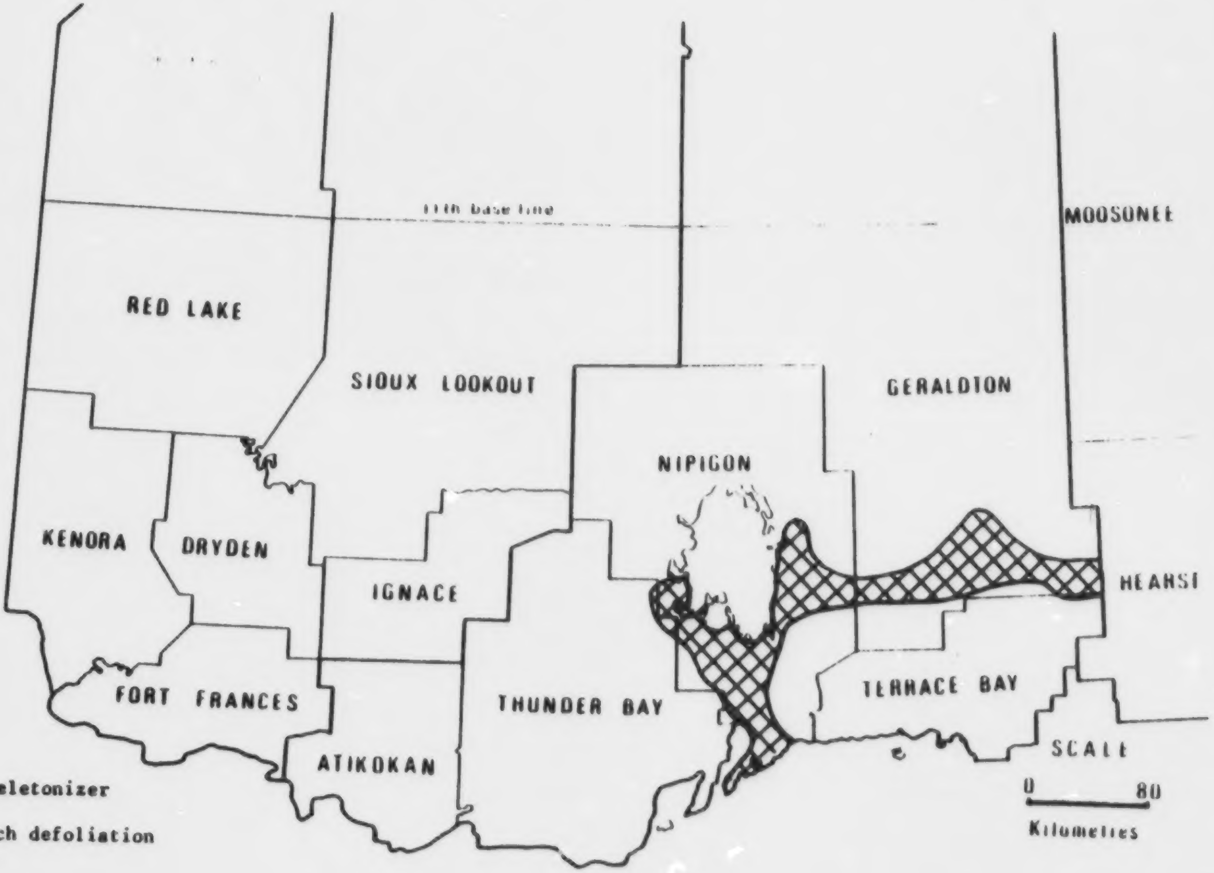
KENORA
DRYDEN
IGNACE
HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres
LEGEND
Light defoliation ▨
Moderate-to-severe defoliation ▩

Birch Skeletonizer

Areas within which defoliation occurred in 1963

NORTHWESTERN ONTARIO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GERALDTON
NIPIGON
KENORA
DRYDEN
IGNACE
HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

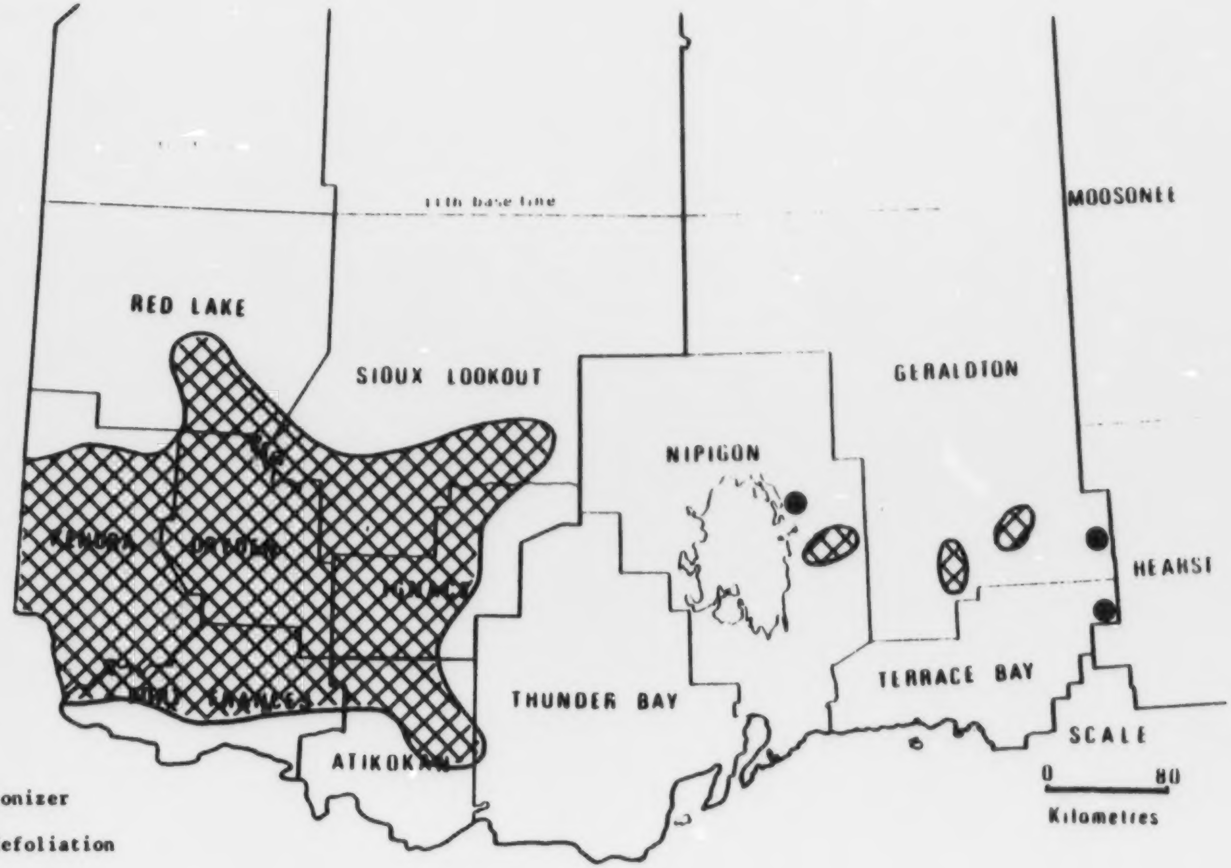
Birch Skeletonizer

Areas within which defoliation occurred in 1964

LEGEND

Moderate-to-severe defoliation ▨

NORTHWESTERN ONTARIO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HEARST
KENORA
DRYDEN
IGNACE
FORT FRANCES
ATIKOKAN
THUNDER BAY
TERRACE BAY
SCALE
0
80
Kilometres

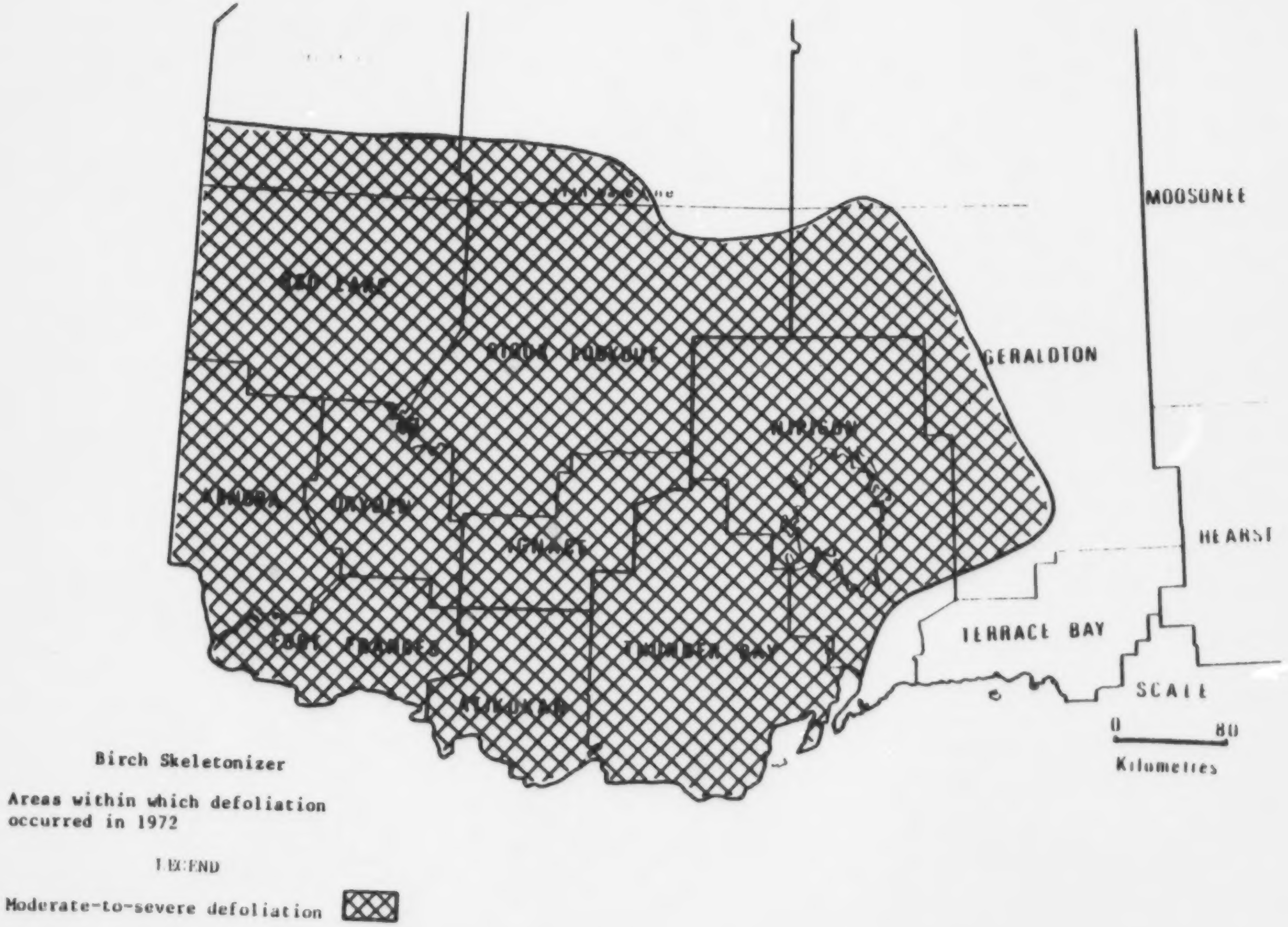
Birch Skeletonizer

Areas within which defoliation
occurred in 1970

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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KENORA
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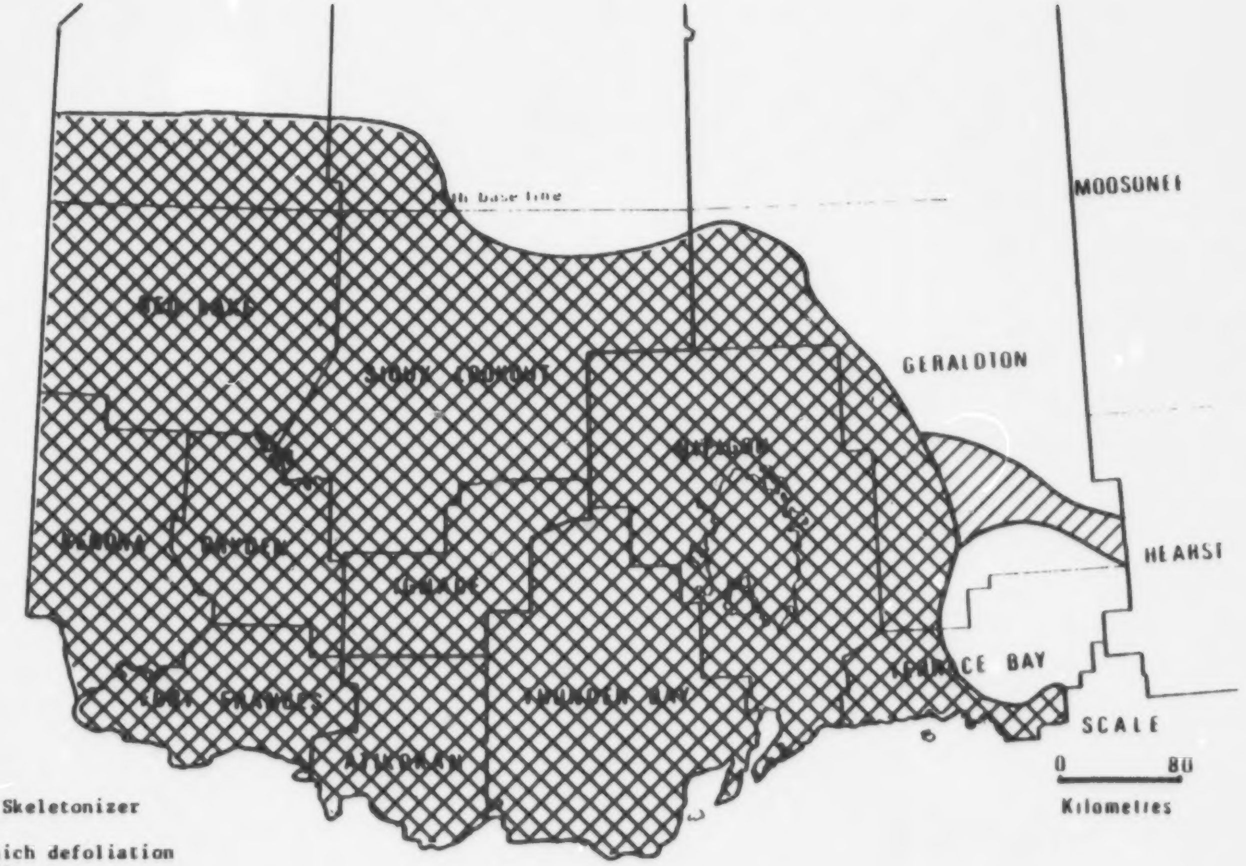
IGNACE
FORT FRANCES
ATIKOKAN
THUNDER BAY
TERRACE BAY
SCALE
0
80
Kilometres
Birch Skeletonizer
Areas within which defoliation occurred in 1972
LEGEND
Moderate-to-severe defoliation ▨

NORTHWESTERN ONTARIO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KENORA
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NIPIGON
TERRACE BAY
FORT FRANCES
ATIKOKAN
THUNDER BAY
SCALE
0
80
Kilometres

Birch Skeletonizer

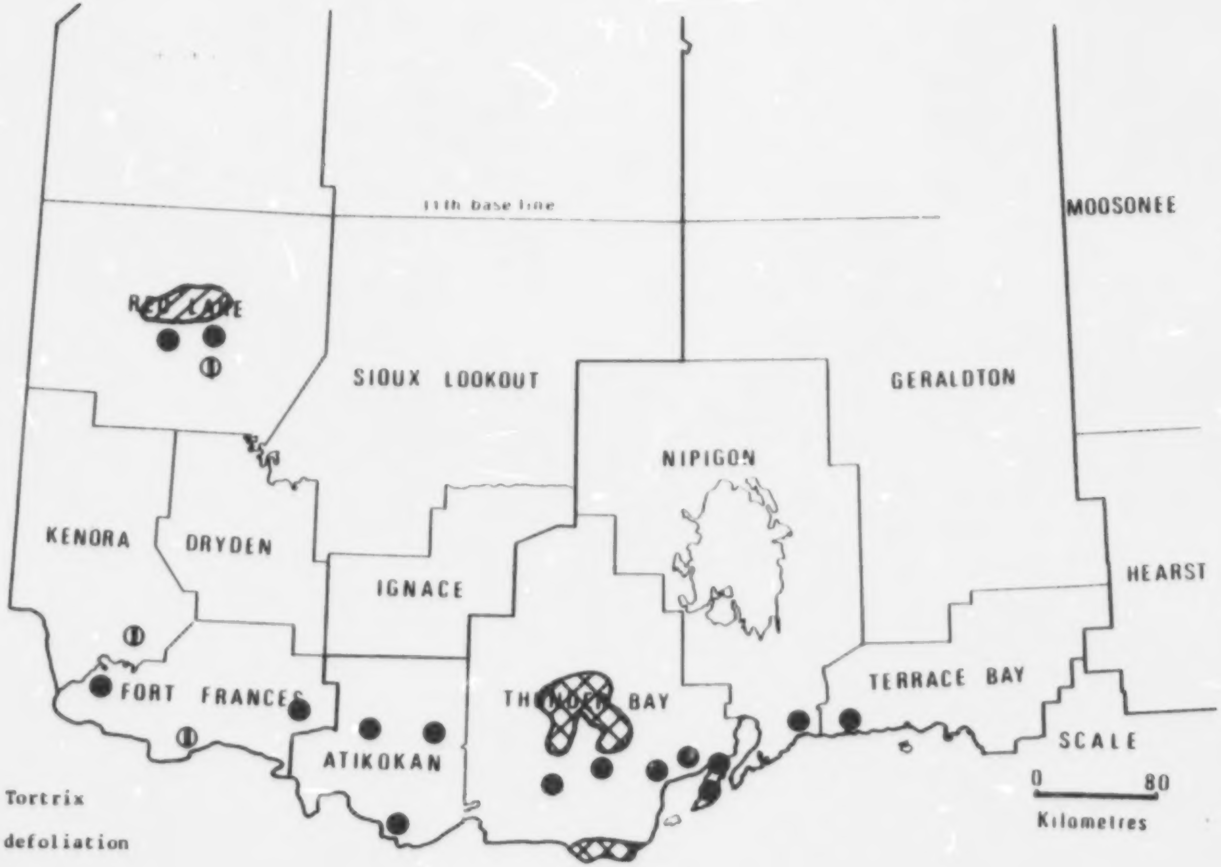
Areas within which defoliation occurred in 1973

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ▩

NORTHWESTERN ONTARIO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IGNACE
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

Large Aspen Tortrix

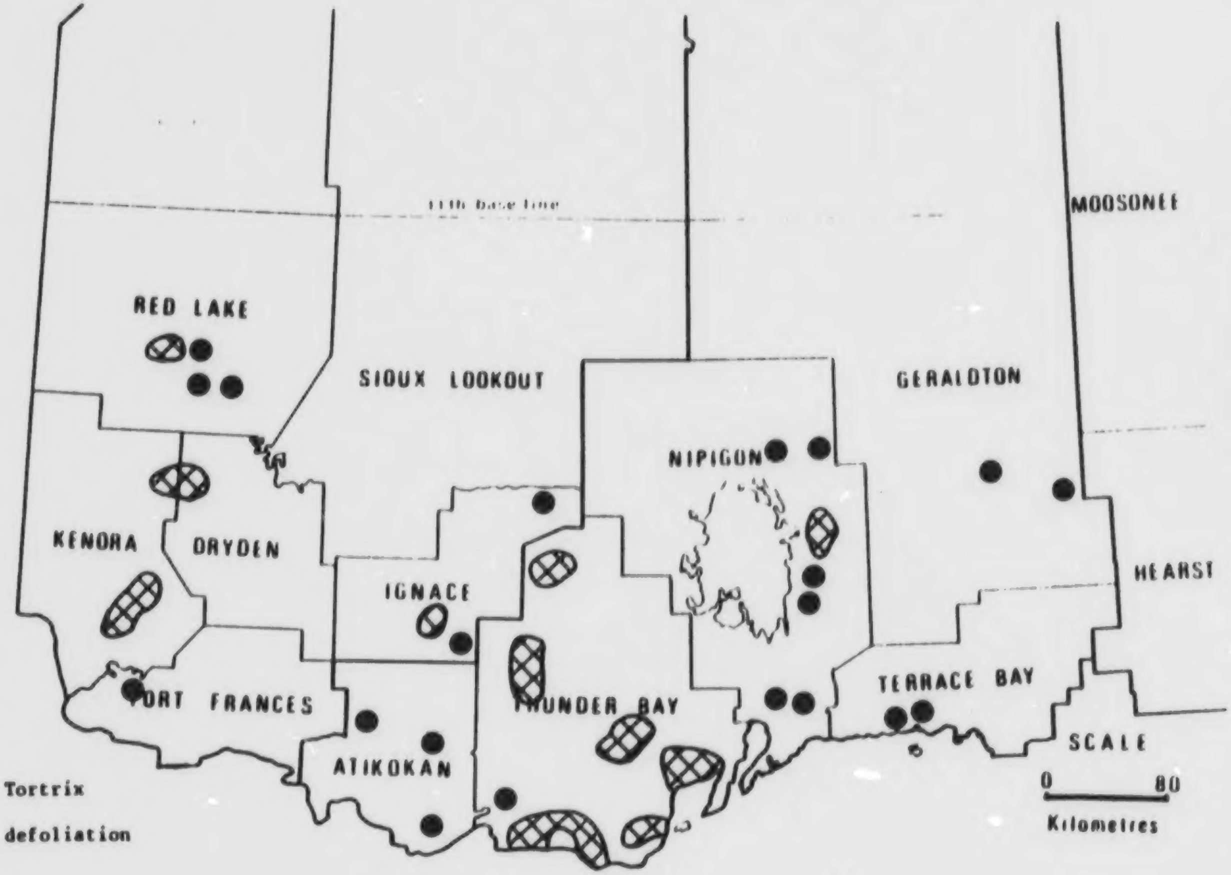
Areas within which defoliation
occurred in 1970

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ⊠

NORTHWESTERN ONTARIO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HEARST
TERRACE BAY
FORT FRANCES
THUNDER BAY
ATIKOKAN
SCALE
0
80
Kilometres

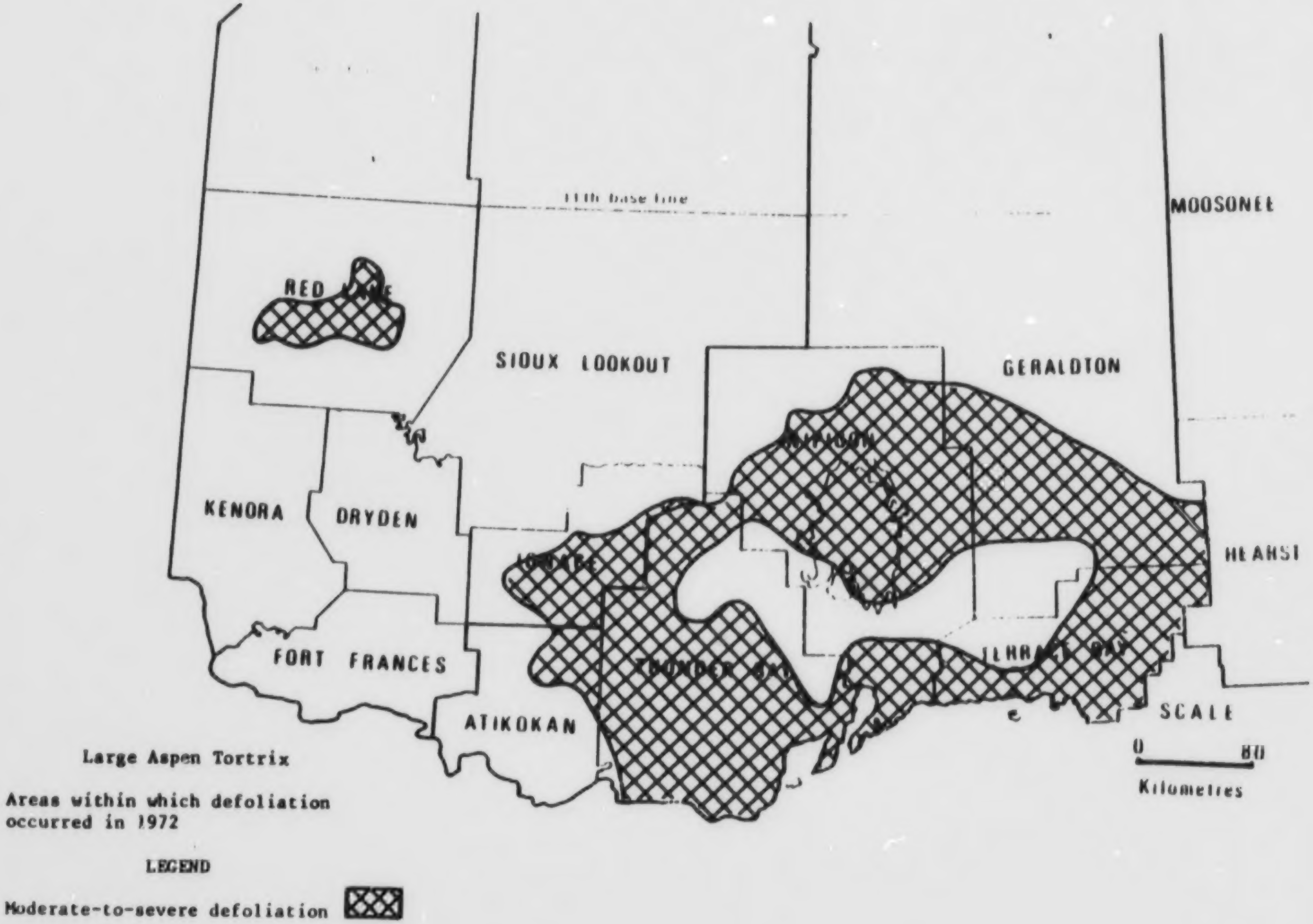
Large Aspen Tortrix

Areas within which defoliation occurred in 1971

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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IGNACE
HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

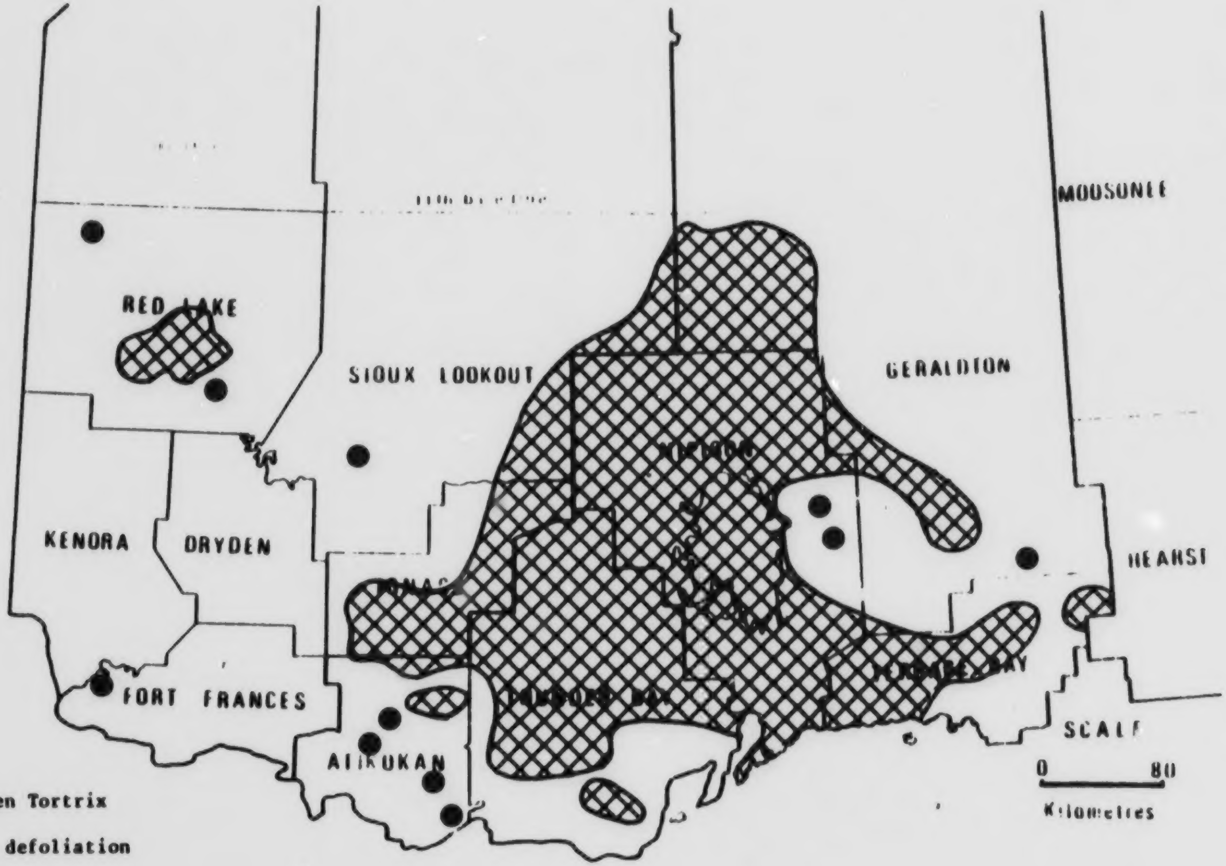
Large Aspen Tortrix

Areas within which defoliation
occurred in 1972

LEGEND

Moderate-to-severe defoliation ▩

NORTHWESTERN ONTARIO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IGNACE
FORT FRANCES
ATIKOKAN
NIPIGON
THUNDER BAY
TERRACE BAY
SCALE
0
80
Kilometres

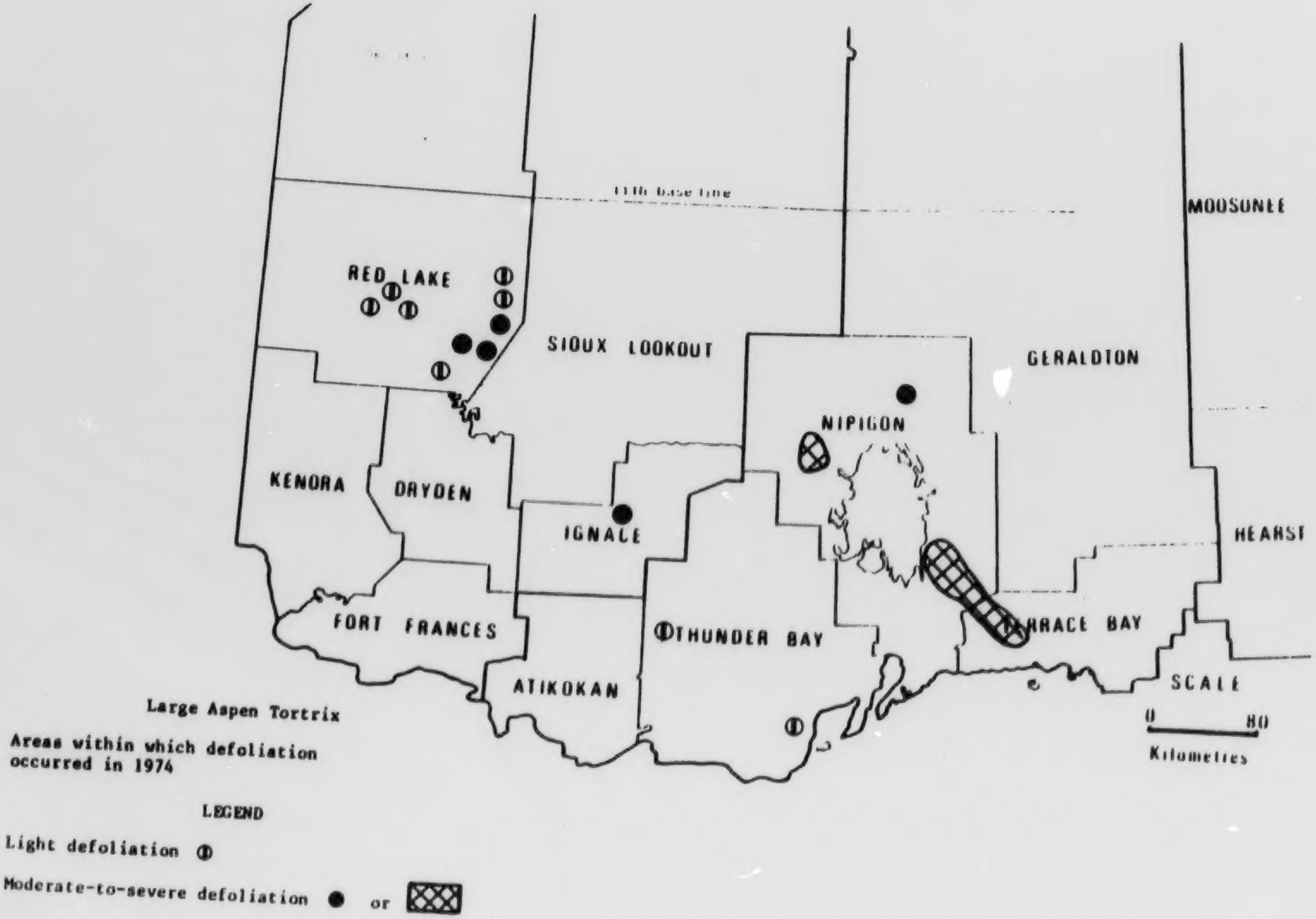
Large Aspen Tortrix

Areas within which defoliation occurred in 1973

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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IGNACE
HEARST
FORT FRANCES
ATIKOKAN
THUNDER BAY
TERRACE BAY
SCALE
0
80
Kilometres

Large Aspen Tortrix

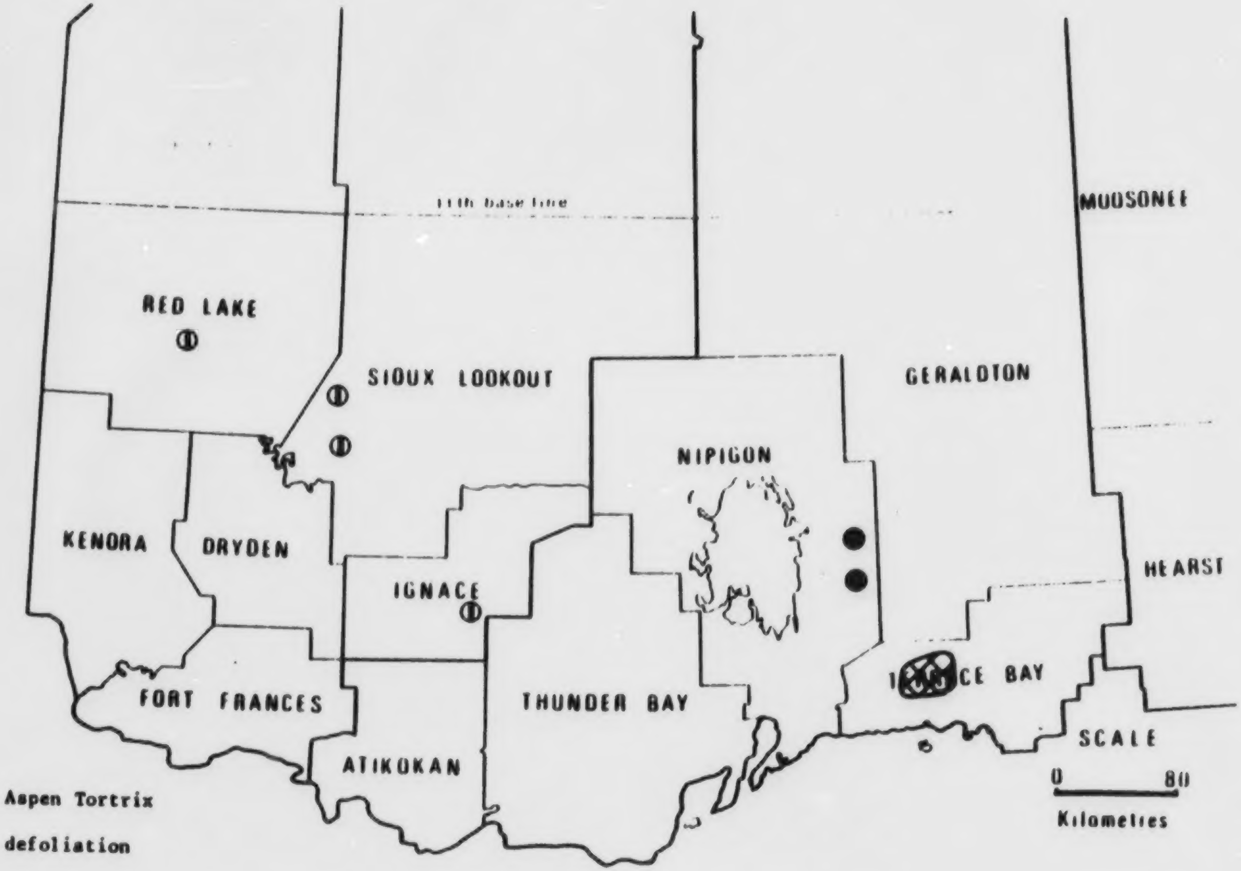
Areas within which defoliation occurred in 1974

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ● or ▩

NORTHWESTERN ONTARIO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KENORA
DRYDEN
IGNACE
HEARST
FORT FRANCES
THUNDER BAY
T CE BAY
ATIKOKAN
SCALE
0
80
Kilometres

Large Aspen Tortrix

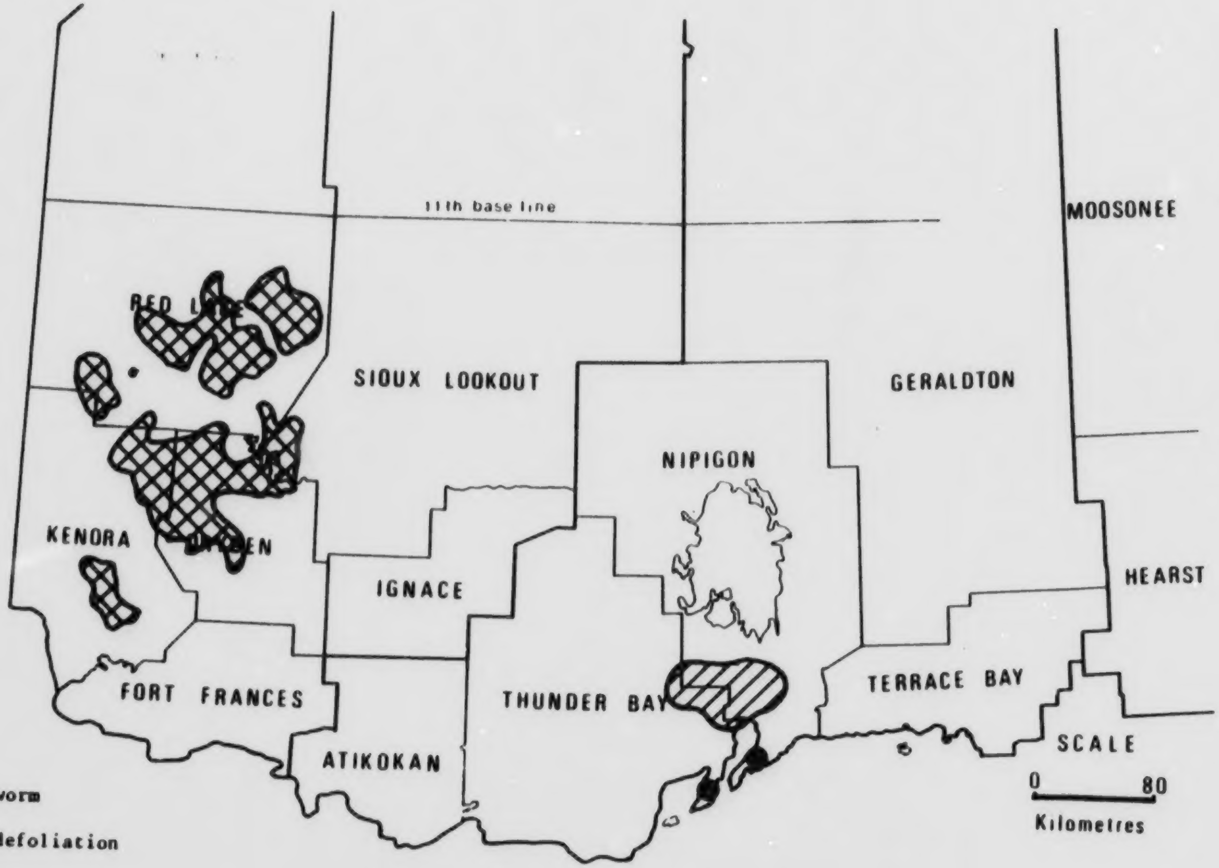
Areas within which defoliation
occurred in 1975

LEGEND

Light defoliation ⦶

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

Spruce Budworm

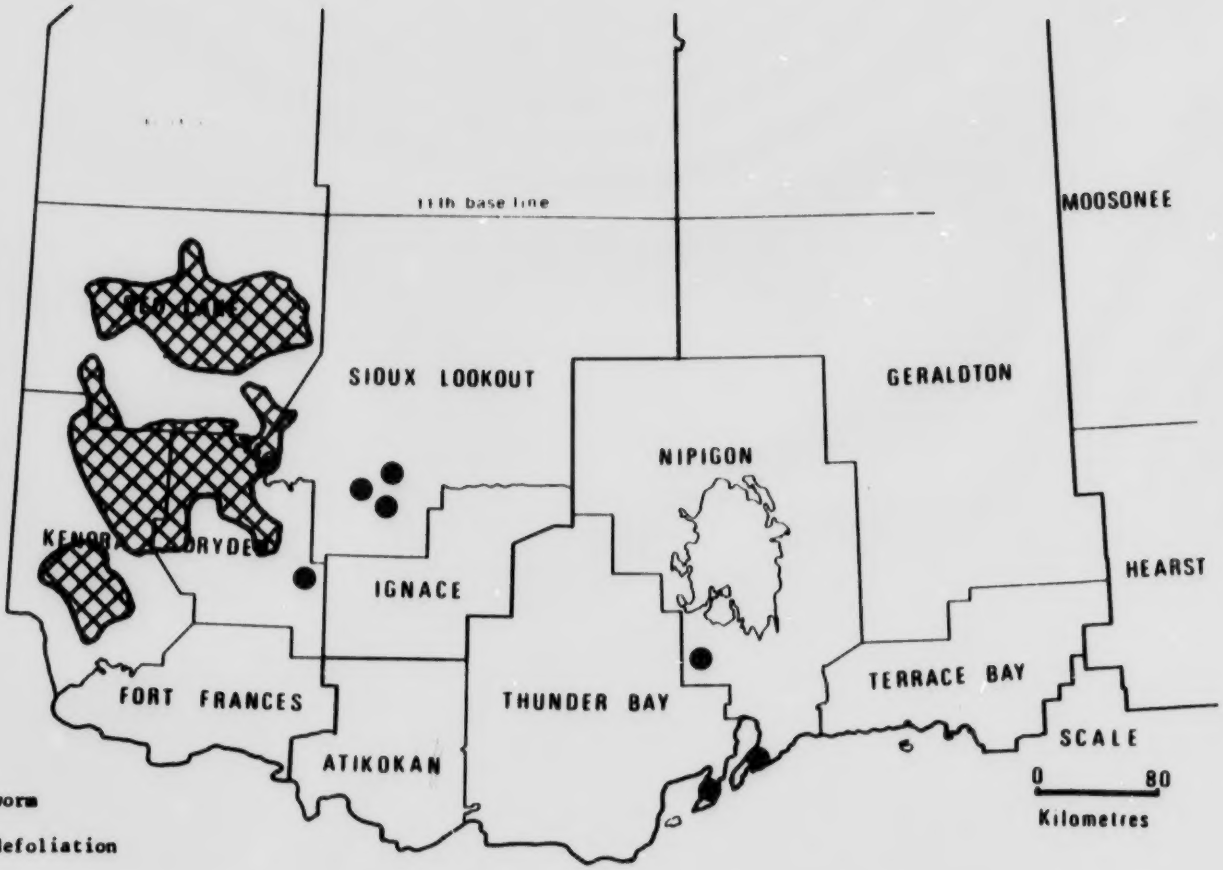
Areas within which defoliation occurred in 1950

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ● or ▩

NORTHWESTERN ONTARIO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THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

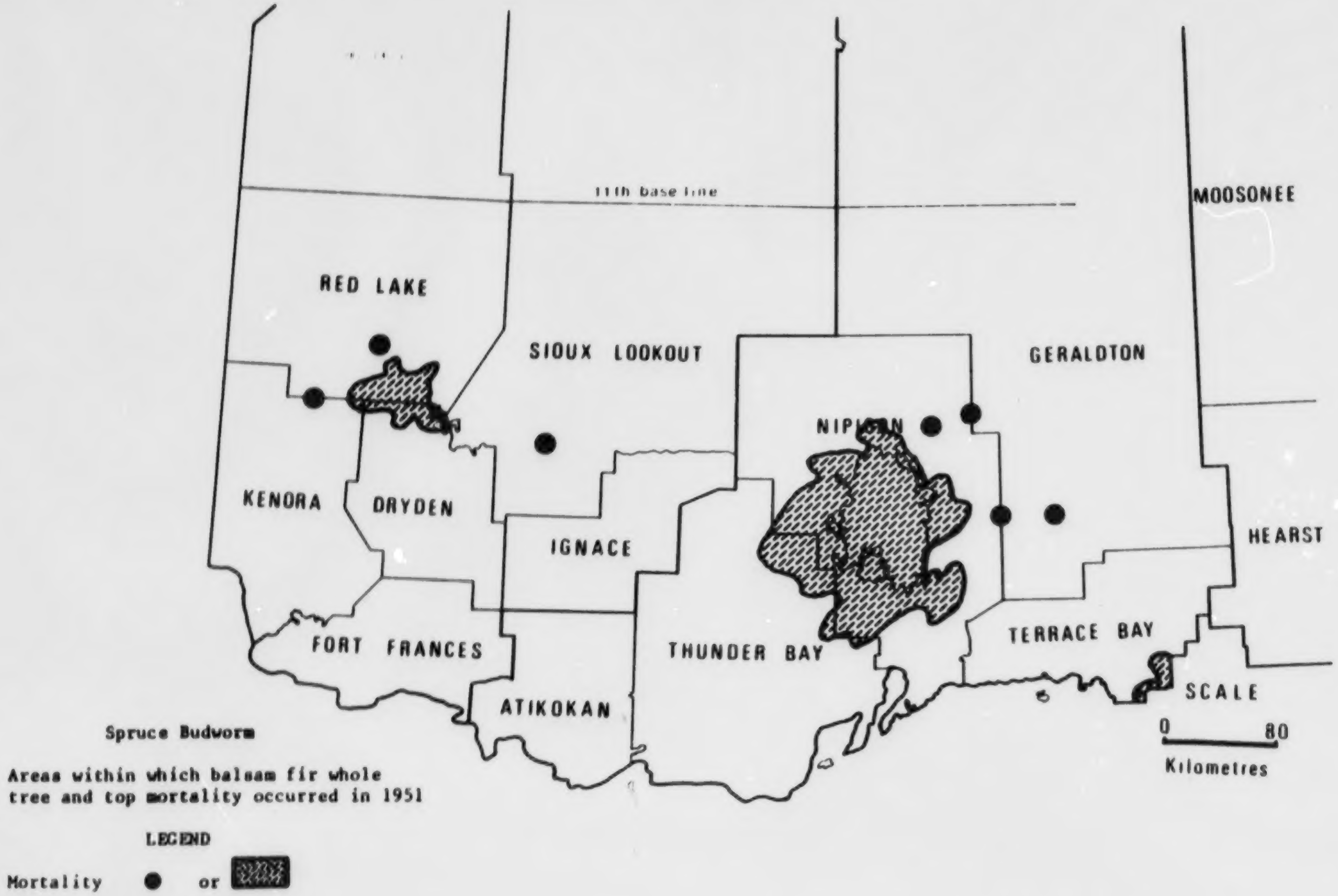
Spruce Budworm

Areas within which defoliation
occurred in 1951

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

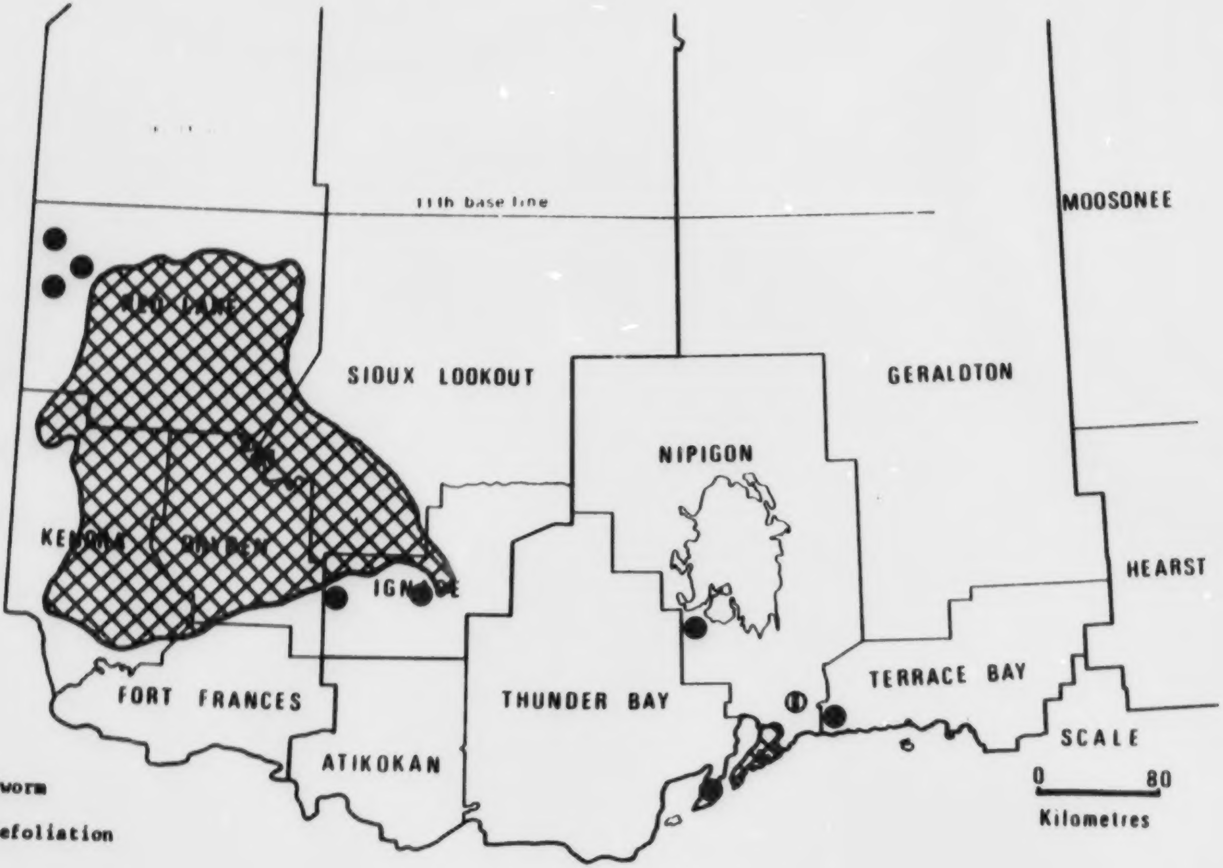
Spruce Budworm

Areas within which balsam fir whole
tree and top mortality occurred in 1951

LEGEND

Mortality ● or ▨

NORTHWESTERN ONTARIO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HEARST
TERRACE BAY
THUNDER BAY
FORT FRANCES
ATIKOKAN
SCALE
0
80
Kilometres

Spruce Budworm

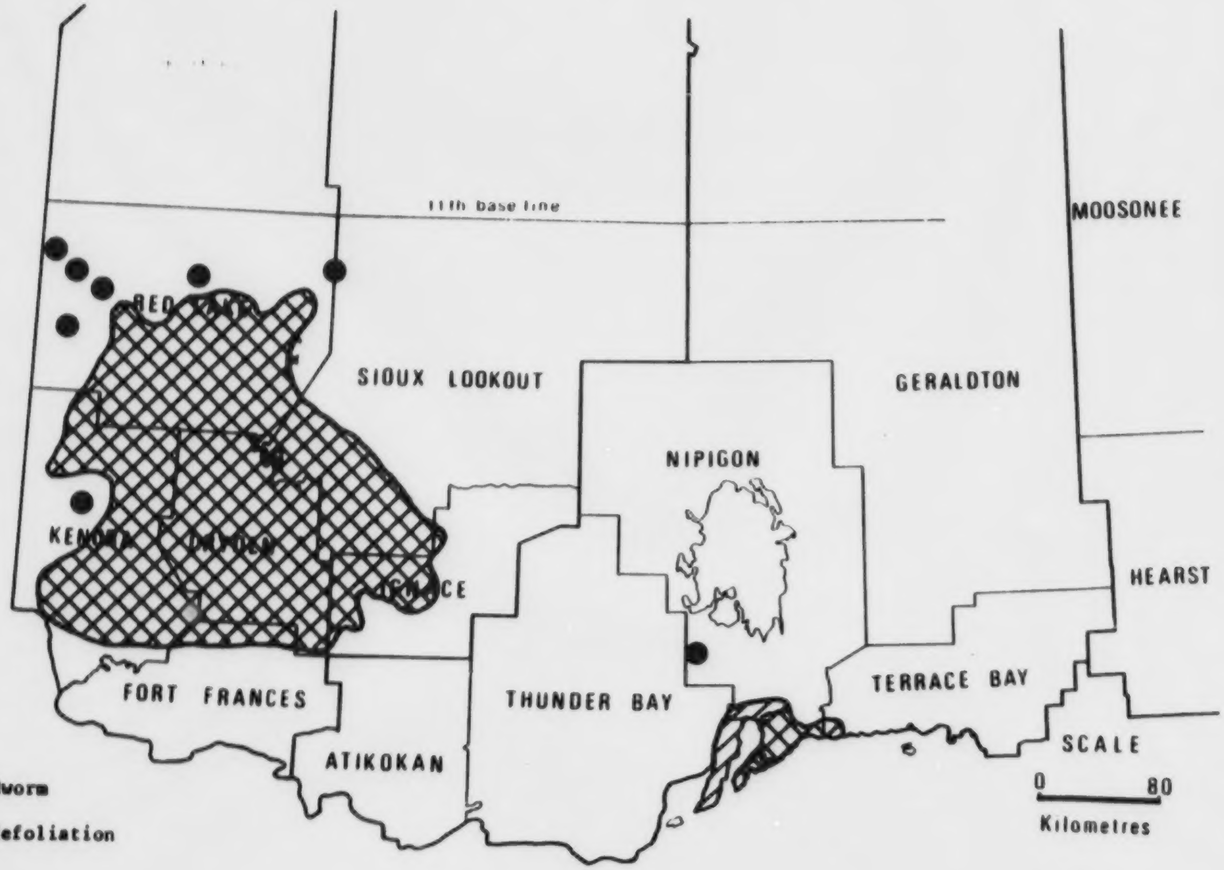
Areas within which defoliation
occurred in 1952

LEGEND

Light defoliation ⦶

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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HEARST
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THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

Spruce Budworm

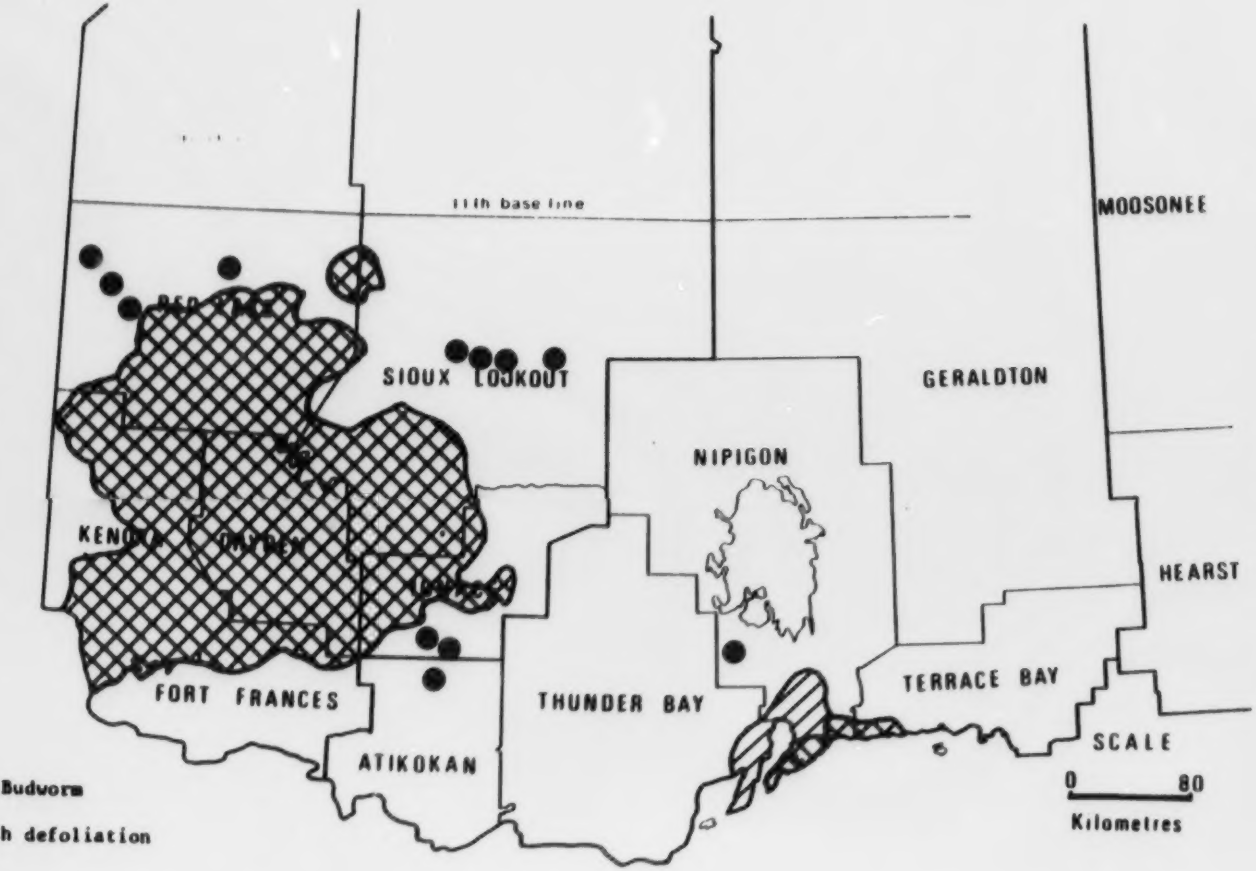
Areas within which defoliation
occurred in 1953

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ● or ▩

NORTHWESTERN ONTARIO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NIPIGON
HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

Spruce Budworm

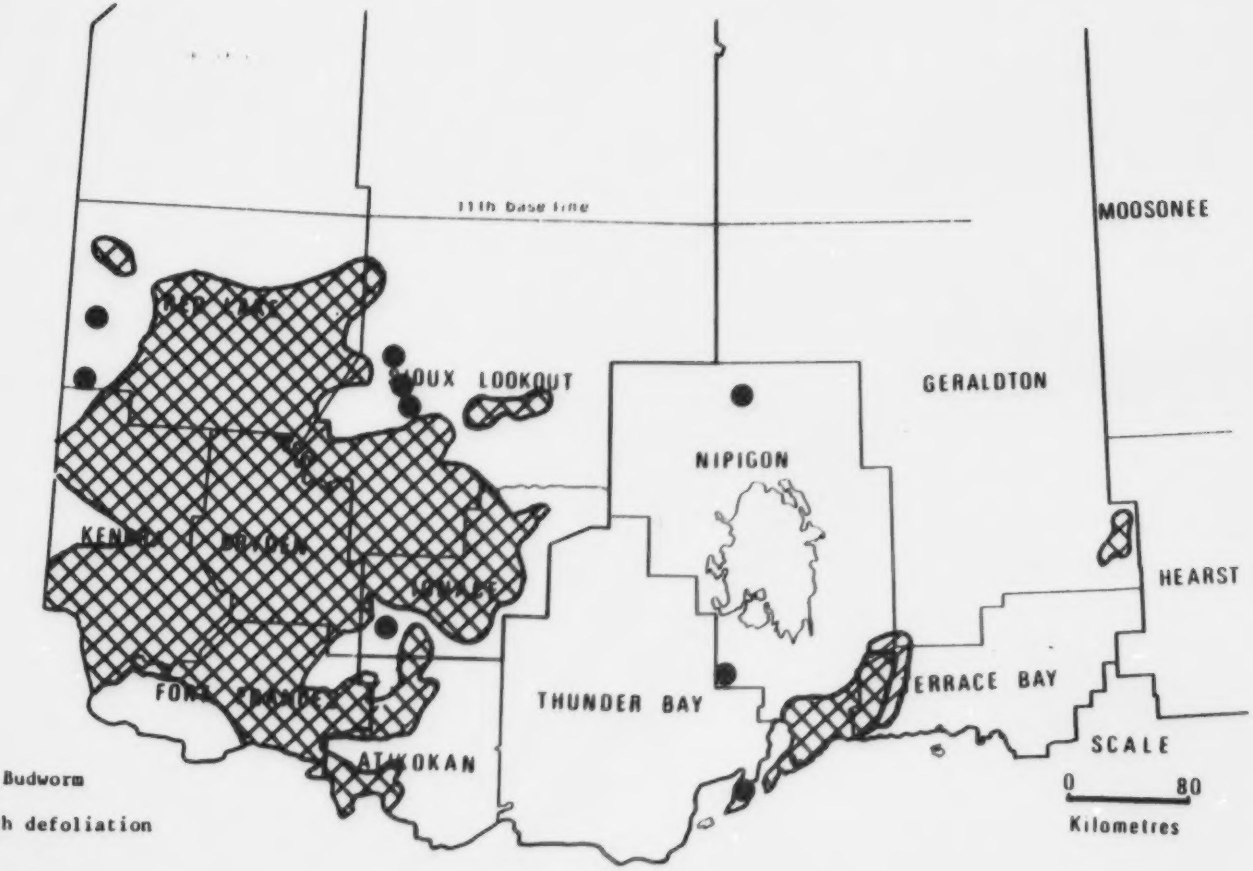
Areas within which defoliation occurred in 1954

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ● or ▩

NORTHWESTERN ONTARIO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GERALDTON
NIPIGON
HEARST
ERRACE BAY
THUNDER BAY
ATIKOKAN
SCALE
0
80
Kilometres

Spruce Budworm

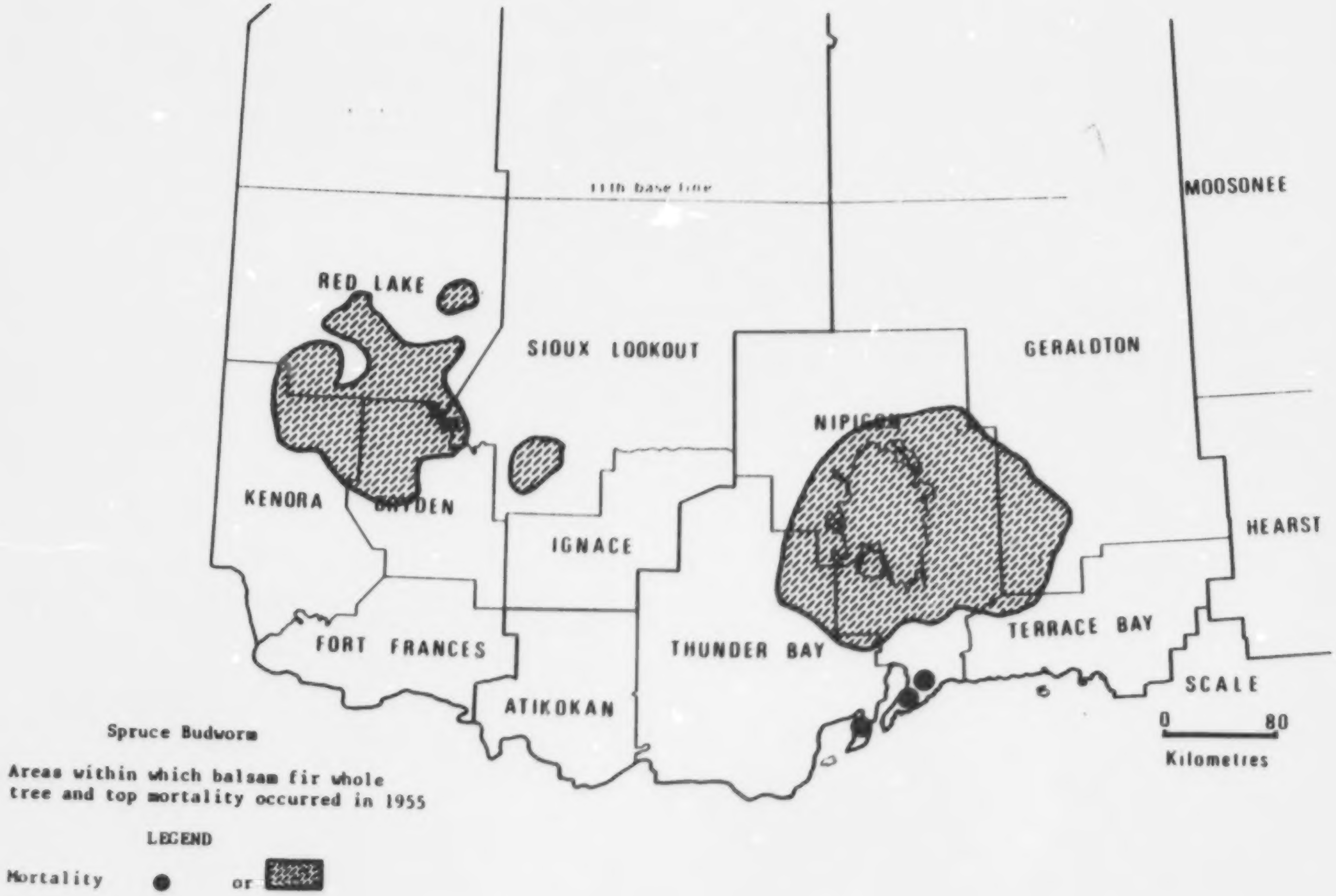
Areas within which defoliation occurred in 1955

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ● or ▦

NORTHWESTERN ONTARIO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IGNACE
HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

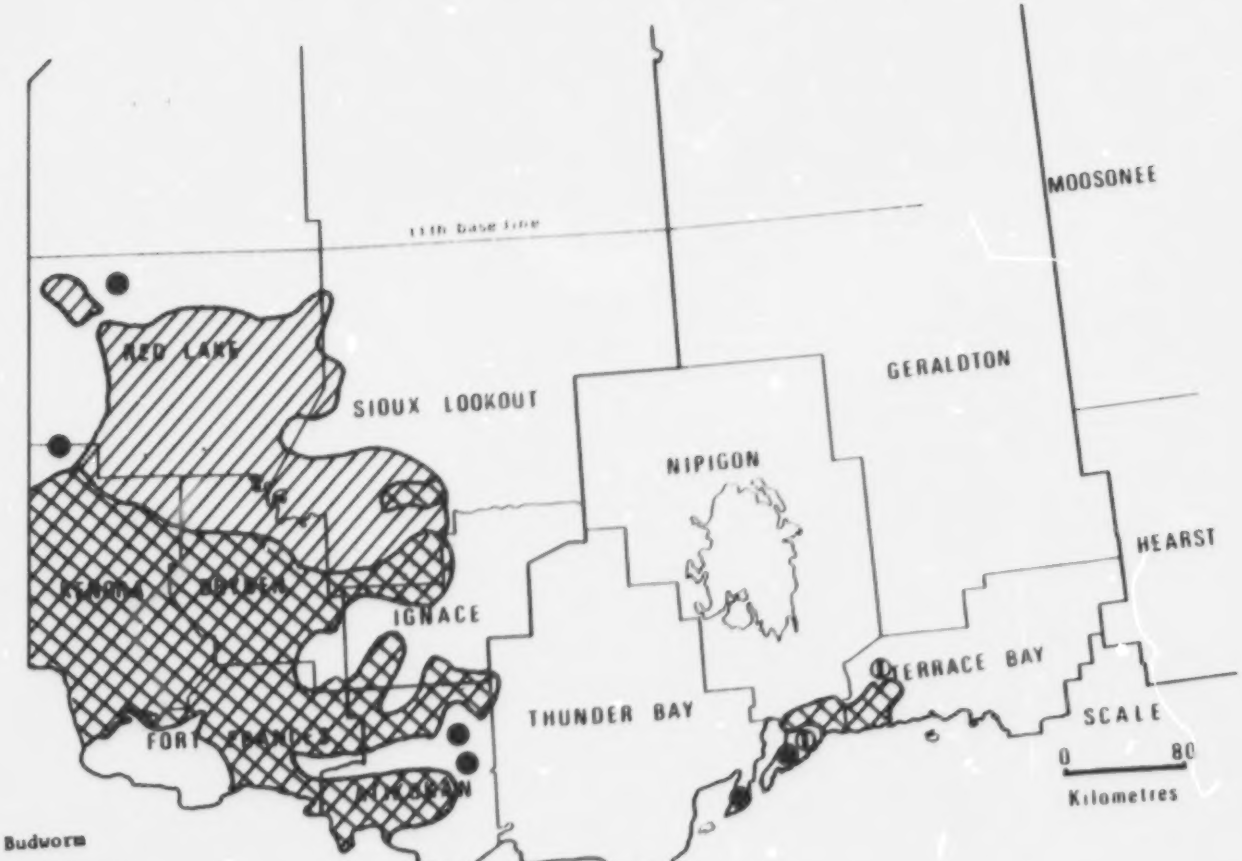
Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1955

LEGEND

Mortality ● or ▨

NORTHWESTERN ONTARIO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KENORA
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TERRACE BAY
THUNDER BAY
FORT FRANCES
ATIKOKAN
SCALE
0
80
Kilometres

Spruce Budworm

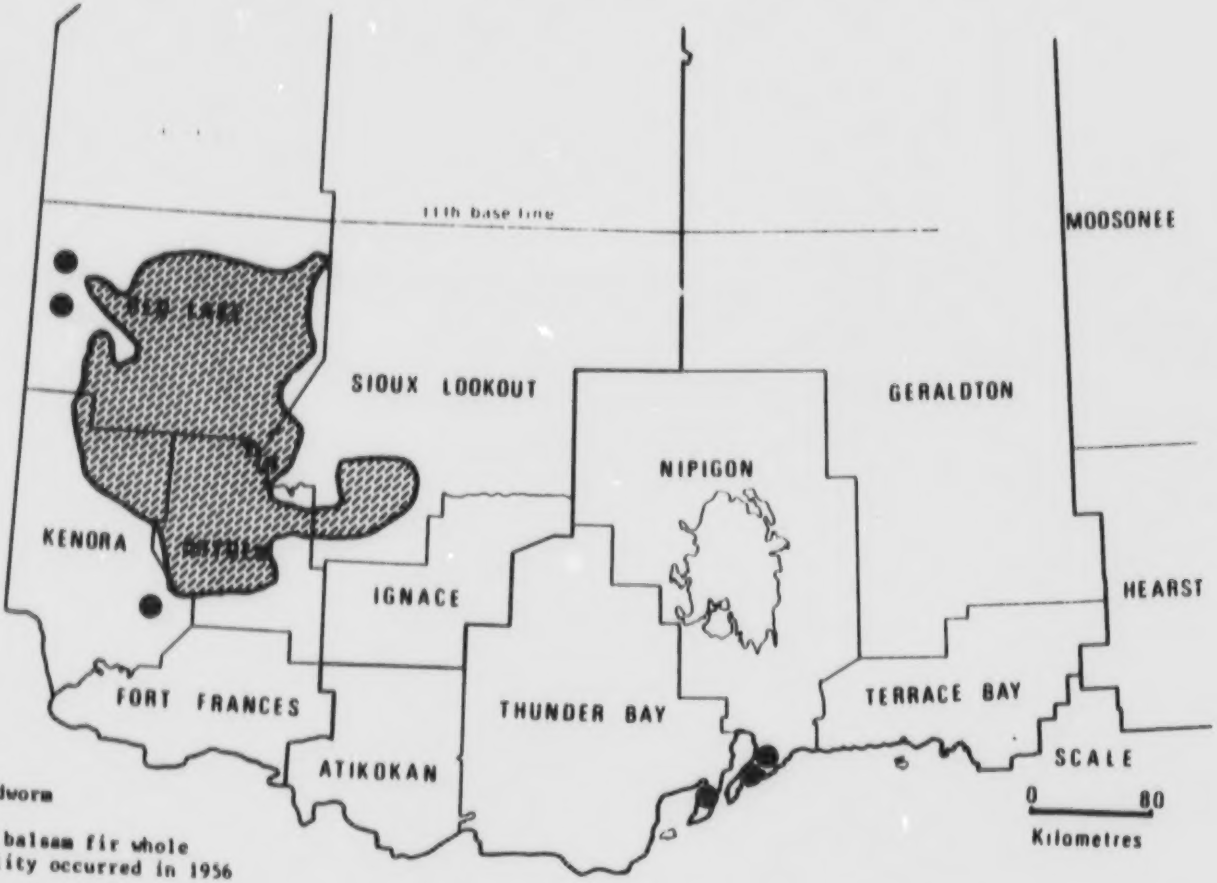
Areas within which defoliation occurred in 1956

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHWESTERN ONTARIO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HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

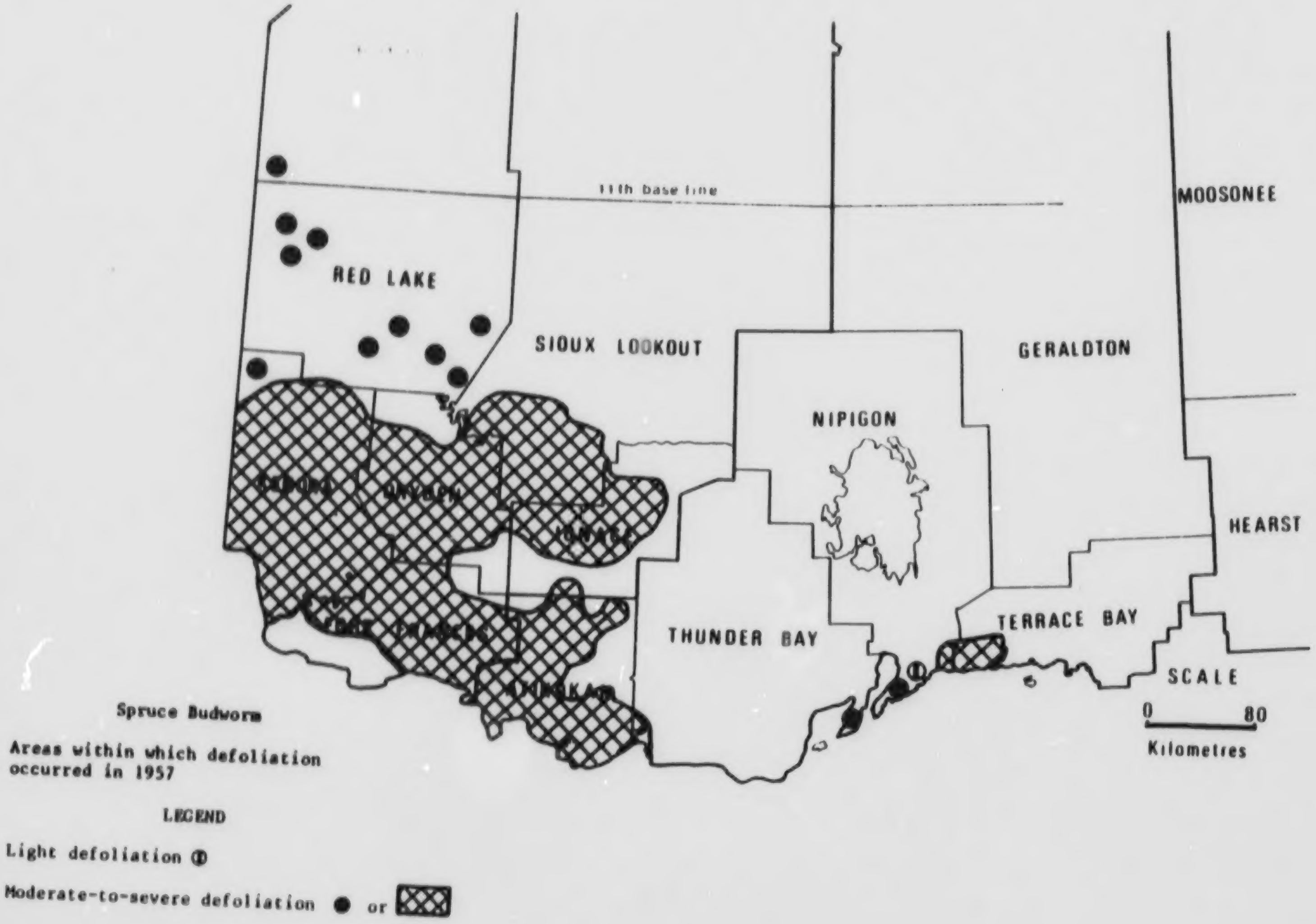
Spruce Budworm

Areas within which balsam fir whole
tree and top mortality occurred in 1956

LEGEND

Mortality ● or ▨

NORTHWESTERN ONTARIO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IGNACE
ATIKOKAN
THUNDER BAY
TERRACE BAY
SCALE
0
80
Kilometres

Spruce Budworm

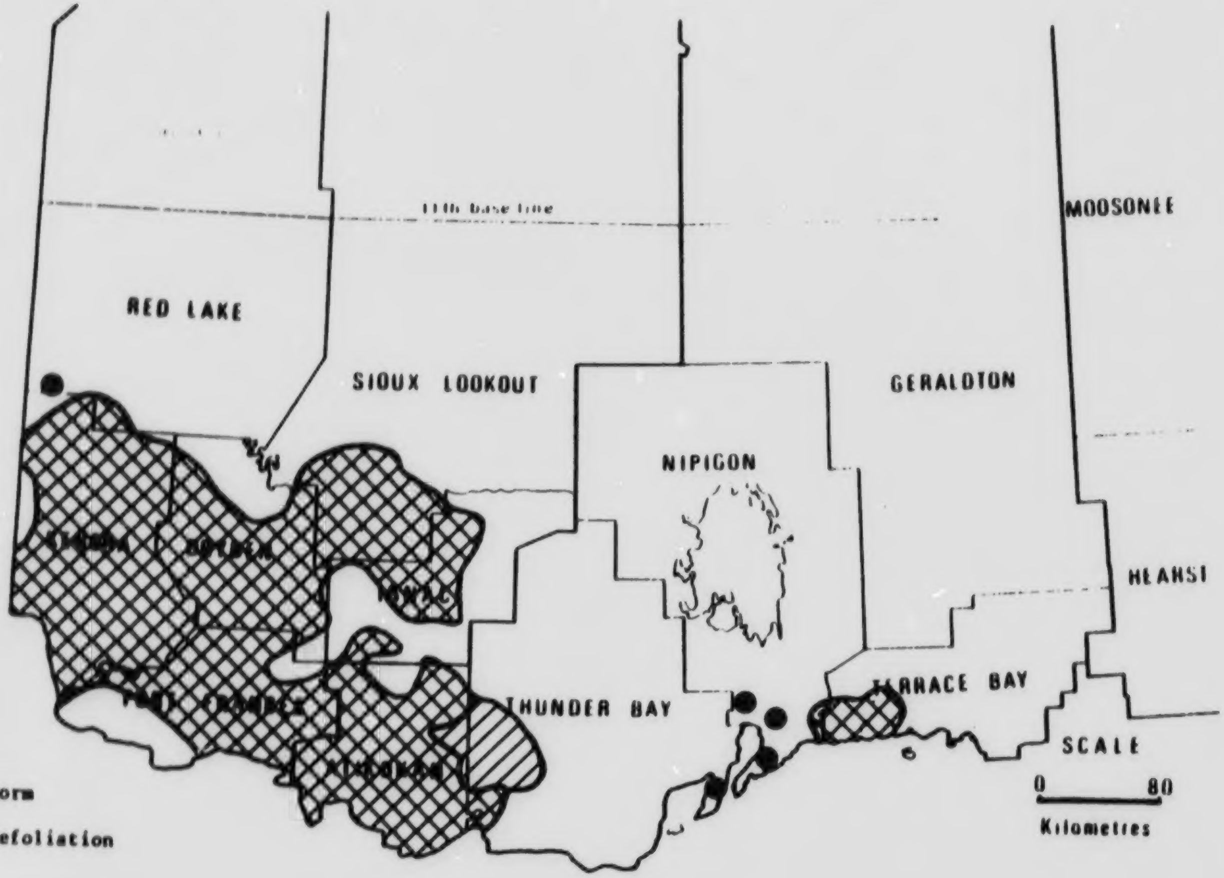
Areas within which defoliation occurred in 1957

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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GERALDTON
NIPIGON
HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
SCALE
0
80
Kilometres

Spruce Budworm

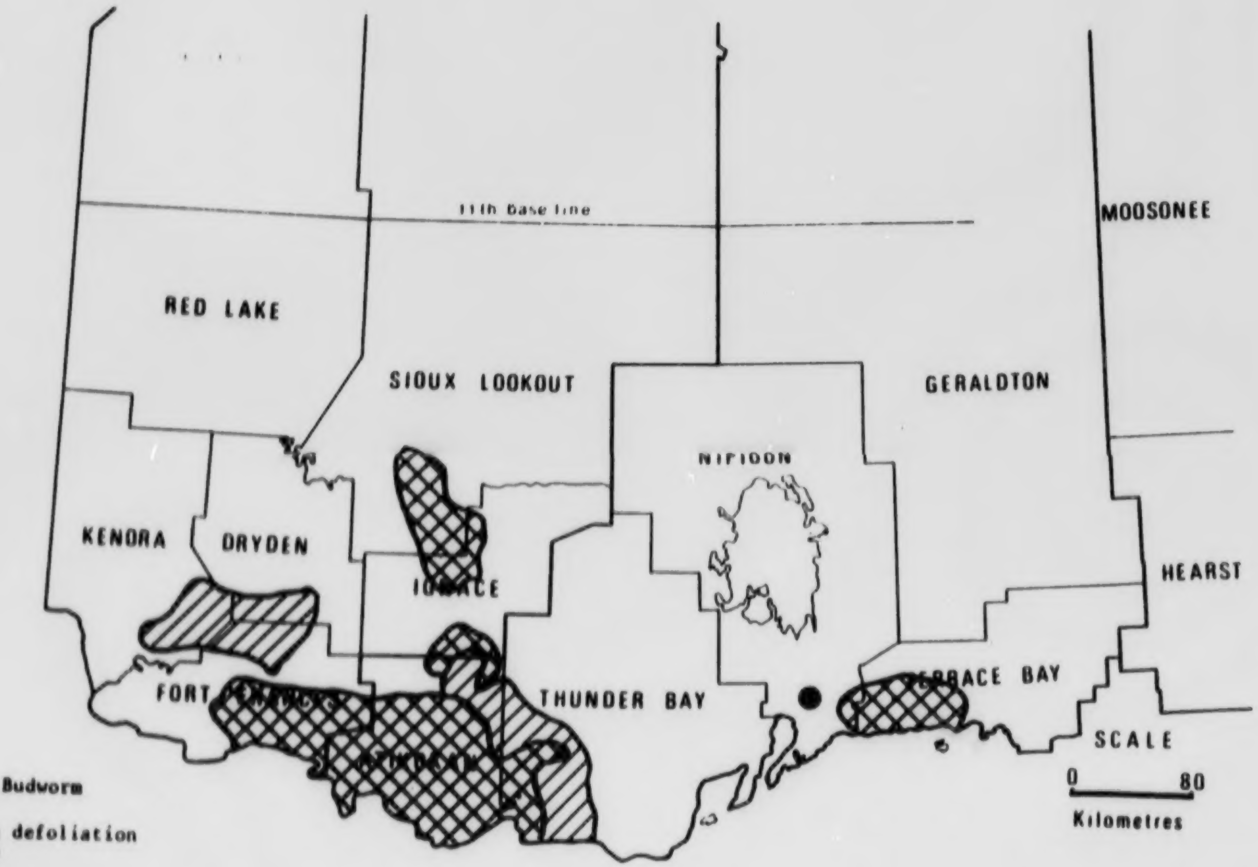
Areas within which defoliation occurred in 1958

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ● or ▩

NORTHWESTERN ONTARIO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IGNACE
FORT
THUNDER BAY
TERRACE BAY
SCALE
0
80
Kilometres

Spruce Budworm

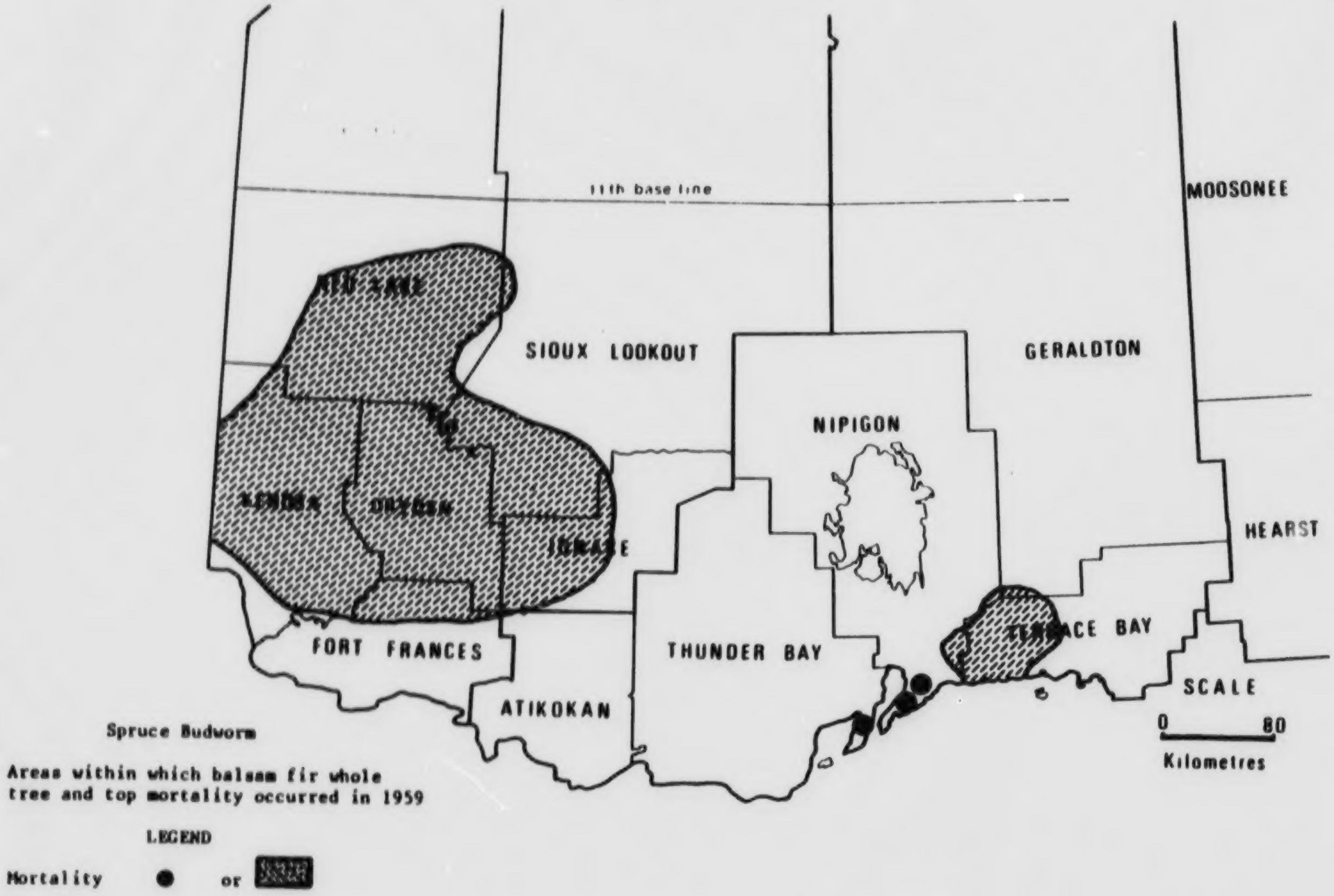
Areas with which defoliation occurred in 1959

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ● or ▦

NORTHWESTERN ONTARIO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FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

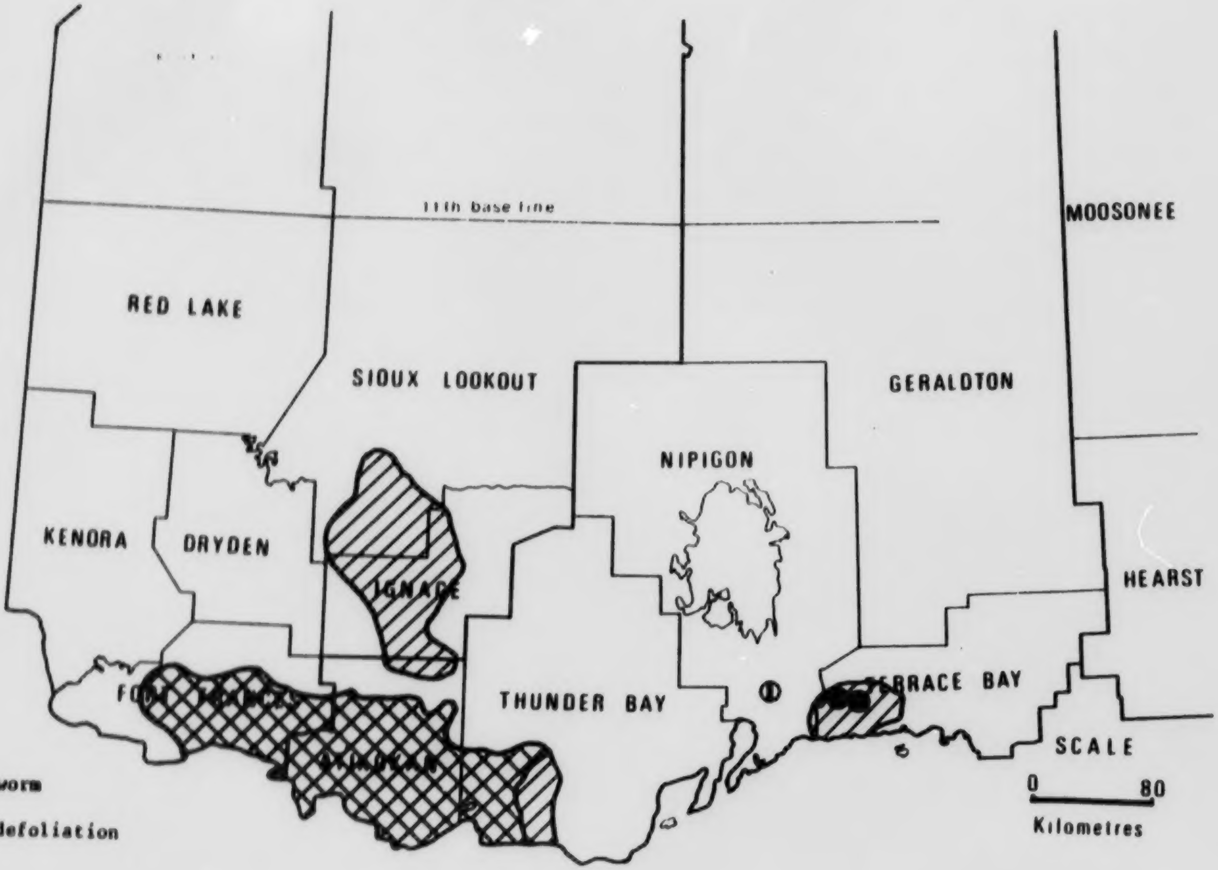
Spruce Budworm

Areas within which balsam fir whole
tree and top mortality occurred in 1959

LEGEND

Mortality ● or ▨

NORTHWESTERN ONTARIO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KENORA
DRYDEN
IGNACE
HEARST
THUNDER BAY
TERRACE BAY
FORT FRANCES
ATIKOKAN
SCALE
0
80
Kilometres

Spruce Budworm

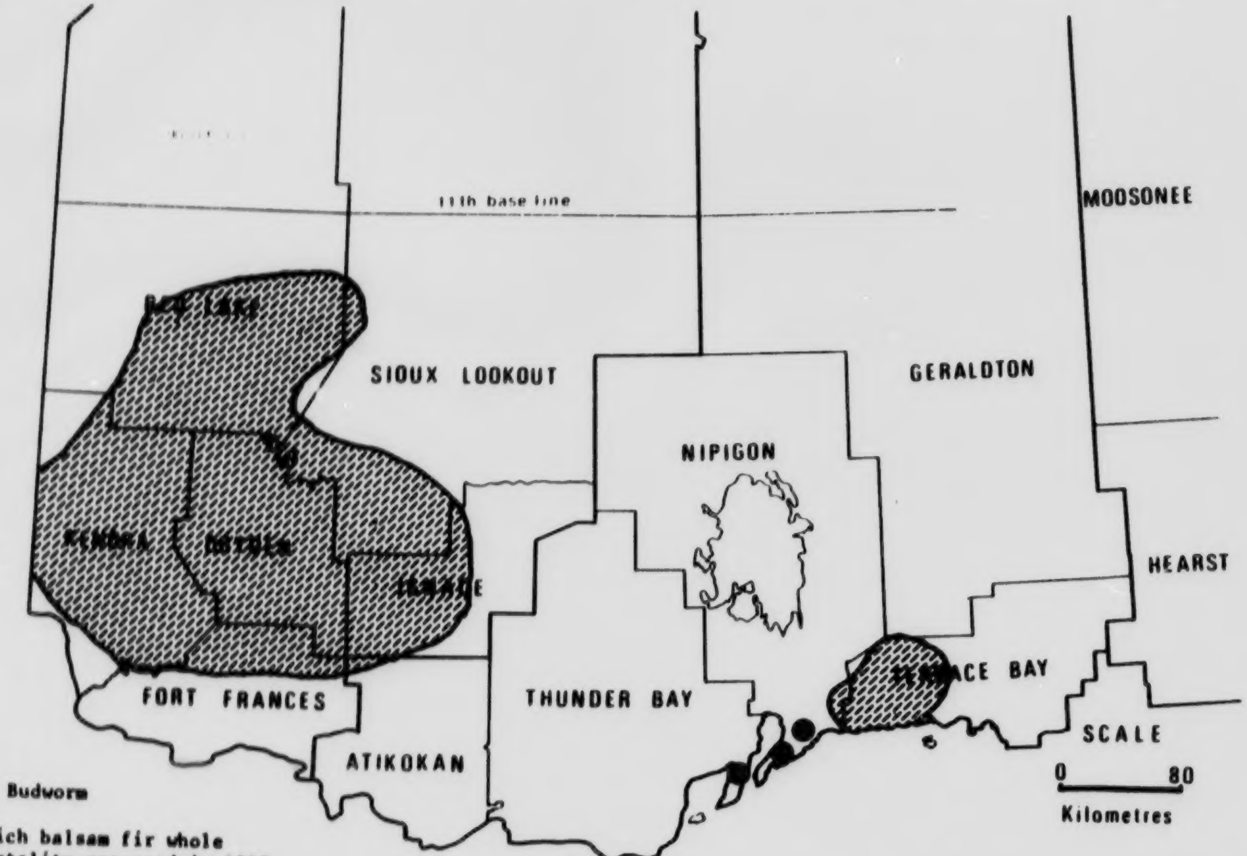
Areas within which defoliation
occurred in 1960

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHWESTERN ONTARIO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KENORA
DRYDEN
IGNACE
HEARST
TERRACE BAY
FORT FRANCES
THUNDER BAY
ATIKOKAN
SCALE
0
80
Kilometres

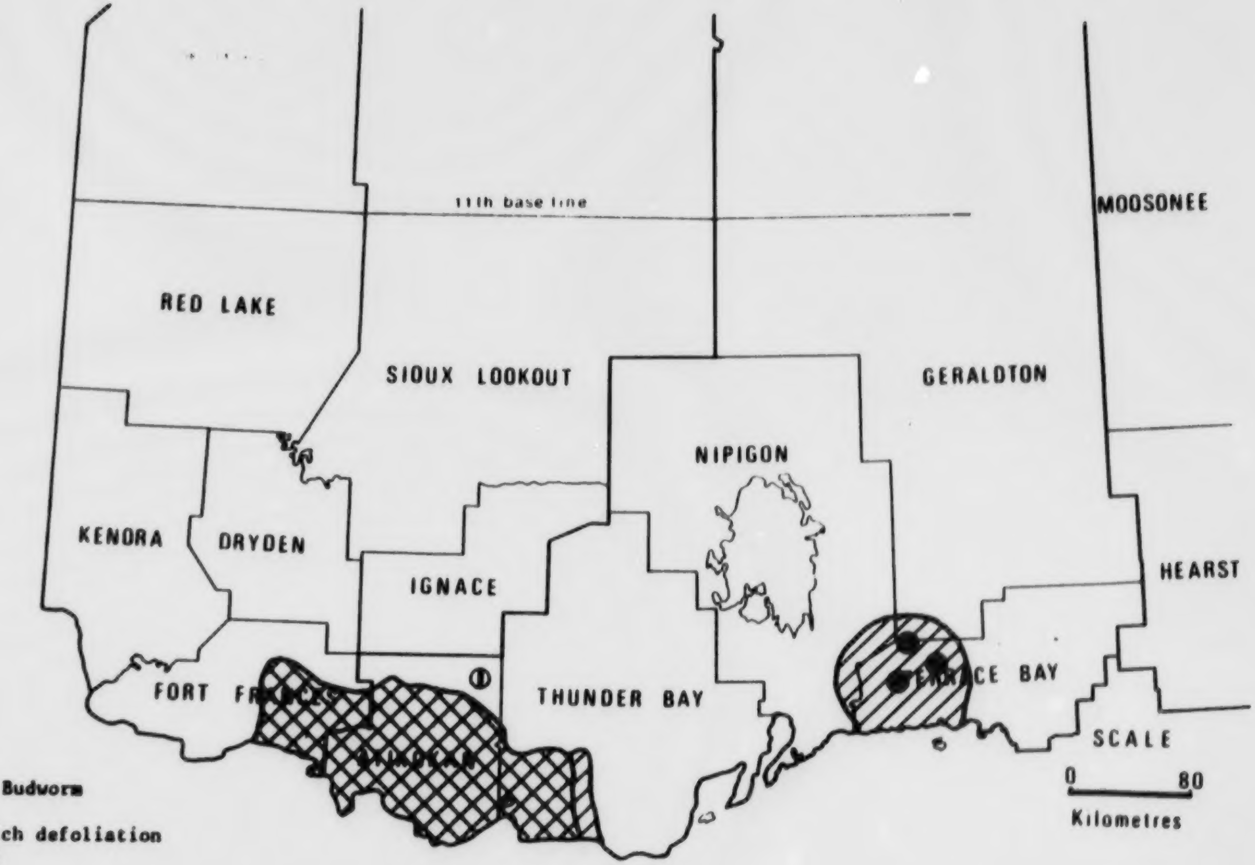
Spruce Budworm

Areas within which balsam fir whole
tree and top mortality occurred in 1960

LEGEND

Mortality ● or ▨

NORTHWESTERN ONTARIO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NIPIGON
KENORA
DRYDEN
IGNACE
HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
SCALE
0
80
Kilometres

Spruce Budworm

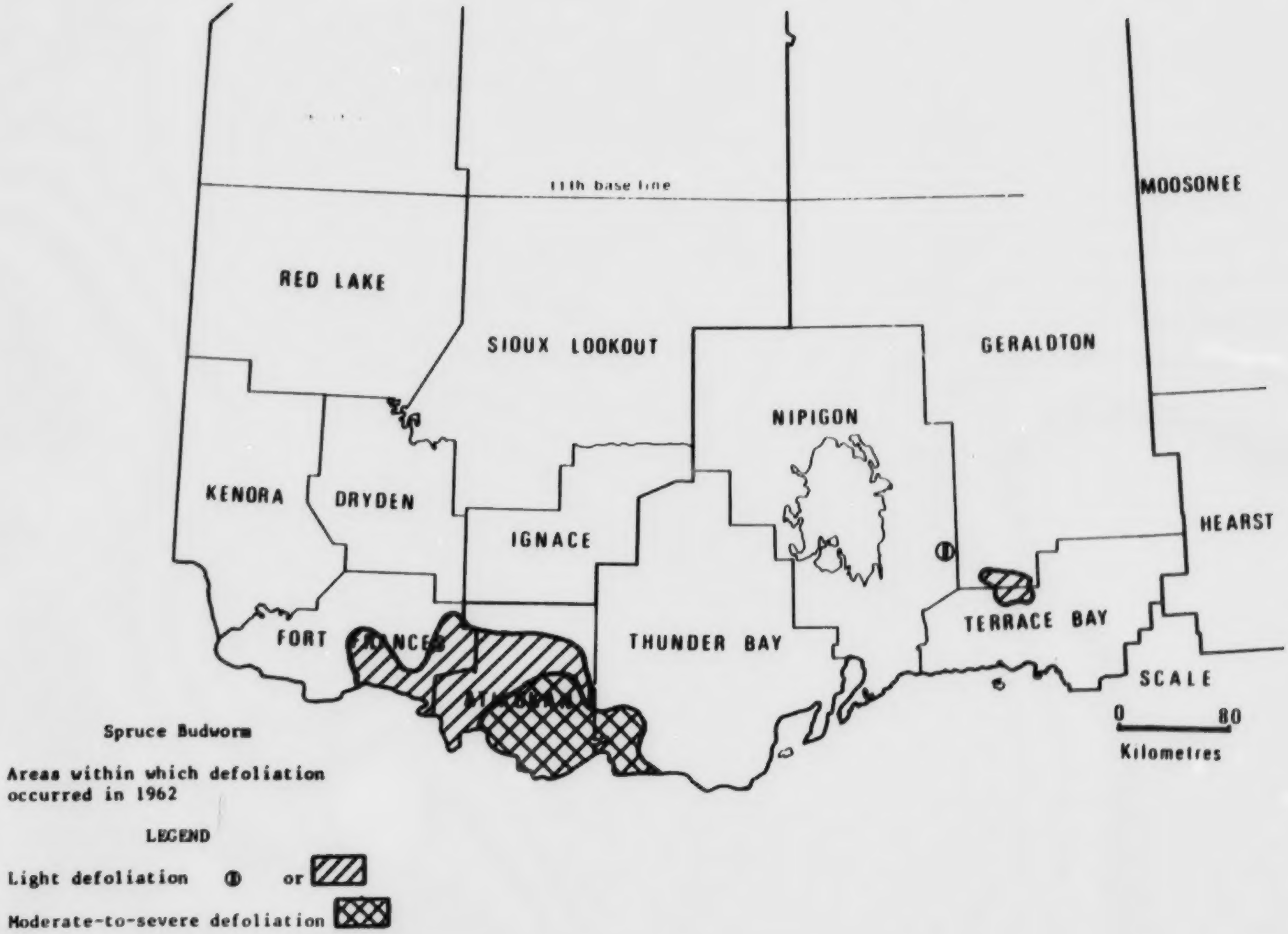
Areas within which defoliation
occurred in 1961

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHWESTERN ONTARIO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GERALDTON
NIPIGON
KENORA
DRYDEN
IGNACE
HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
SCALE
0
80
Kilometres

Spruce Budworm

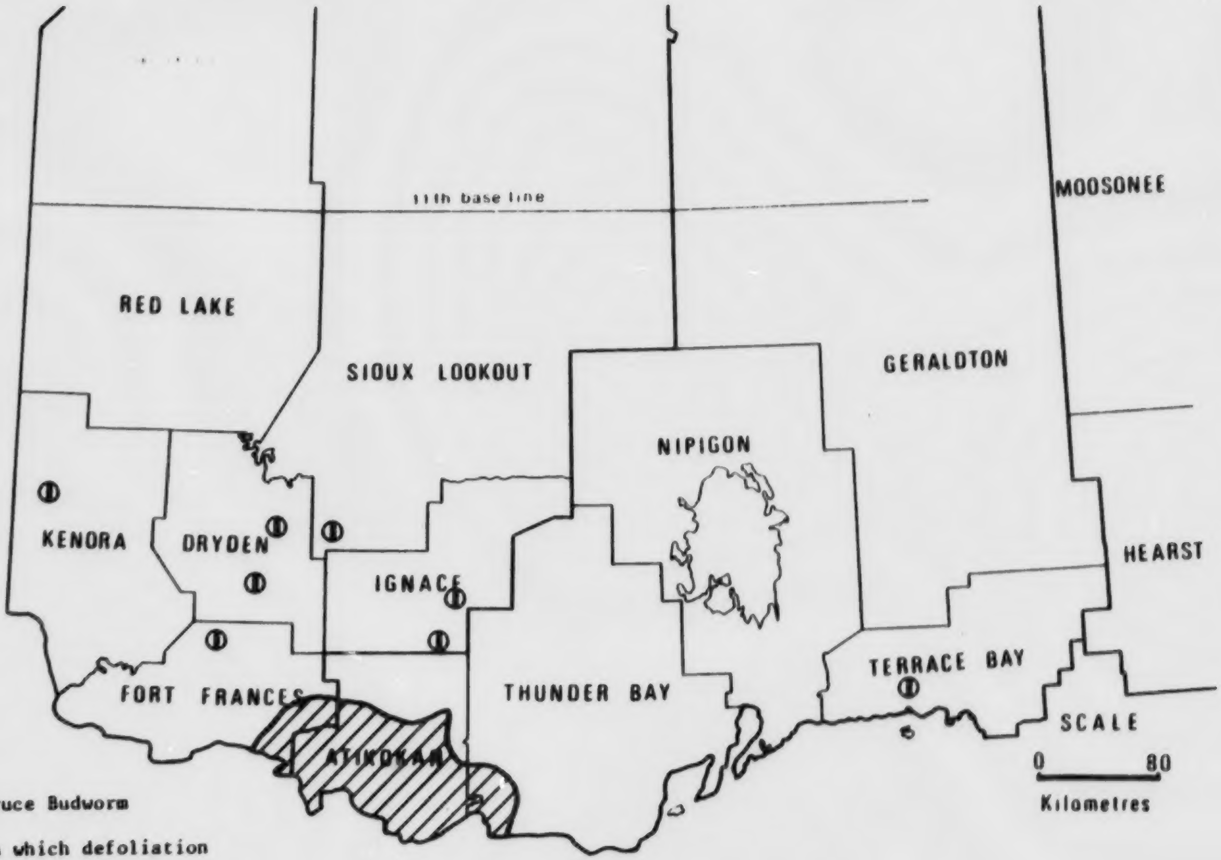
Areas within which defoliation occurred in 1962

LEGEND

Light defoliation ⓛ or ▨

Moderate-to-severe defoliation ▦

NORTHWESTERN ONTARIO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NIPIGON
HEARST
KENORA
DRYDEN
IGNACE
TERRACE BAY
FORT FRANCES
THUNDER BAY
ATIKOKAN
SCALE
0
80
Kilometres

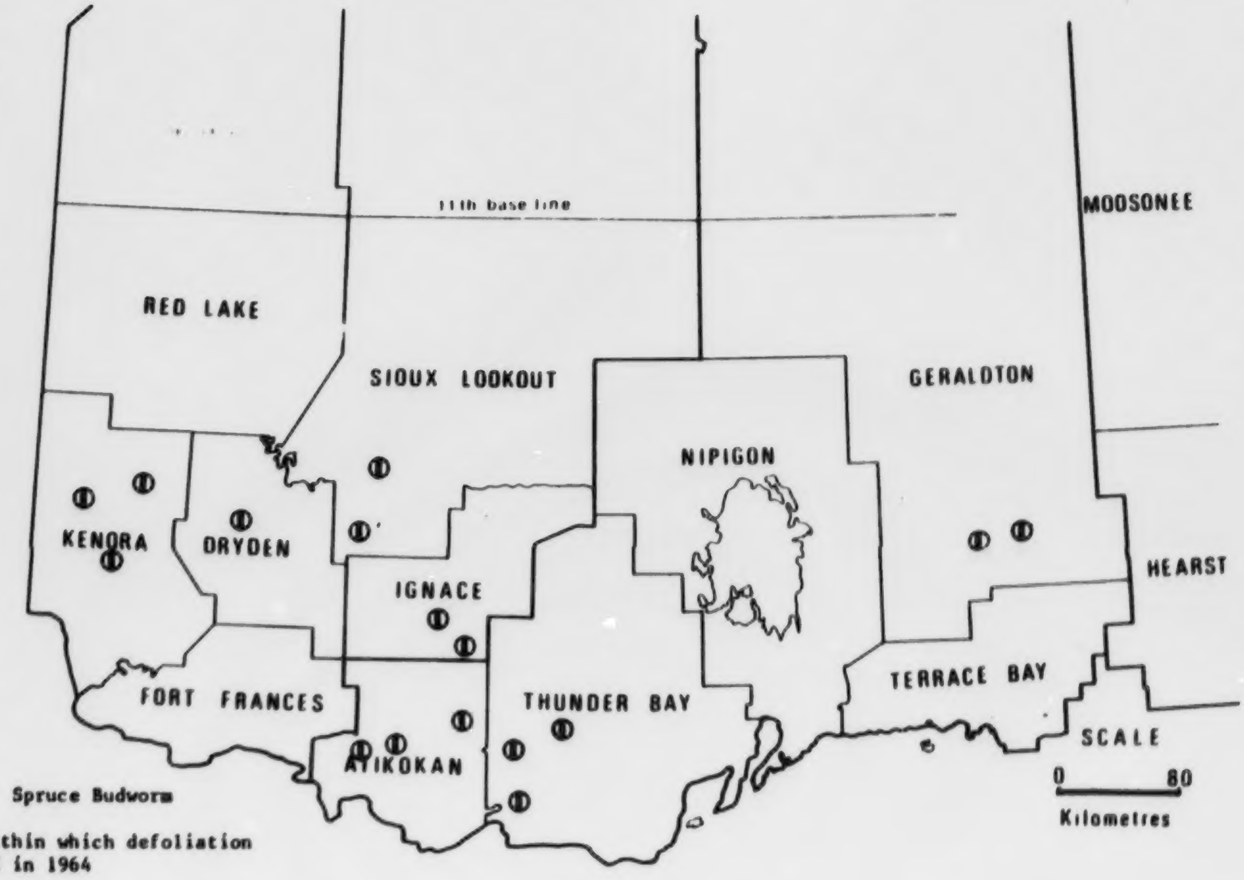
Spruce Budworm

Areas within which defoliation
occurred in 1963

LEGEND

Light defoliation ① or ▨

NORTHWESTERN ONTARIO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MOOSONEE
RED LAKE
SIOUX LOOKOUT
GERALDTON
NIPIGON
KENORA
DRYDEN
IGNACE
HEARST
TERRACE BAY
FORT FRANCES
THUNDER BAY
ATIKOKAN
SCALE
0
80
Kilometres

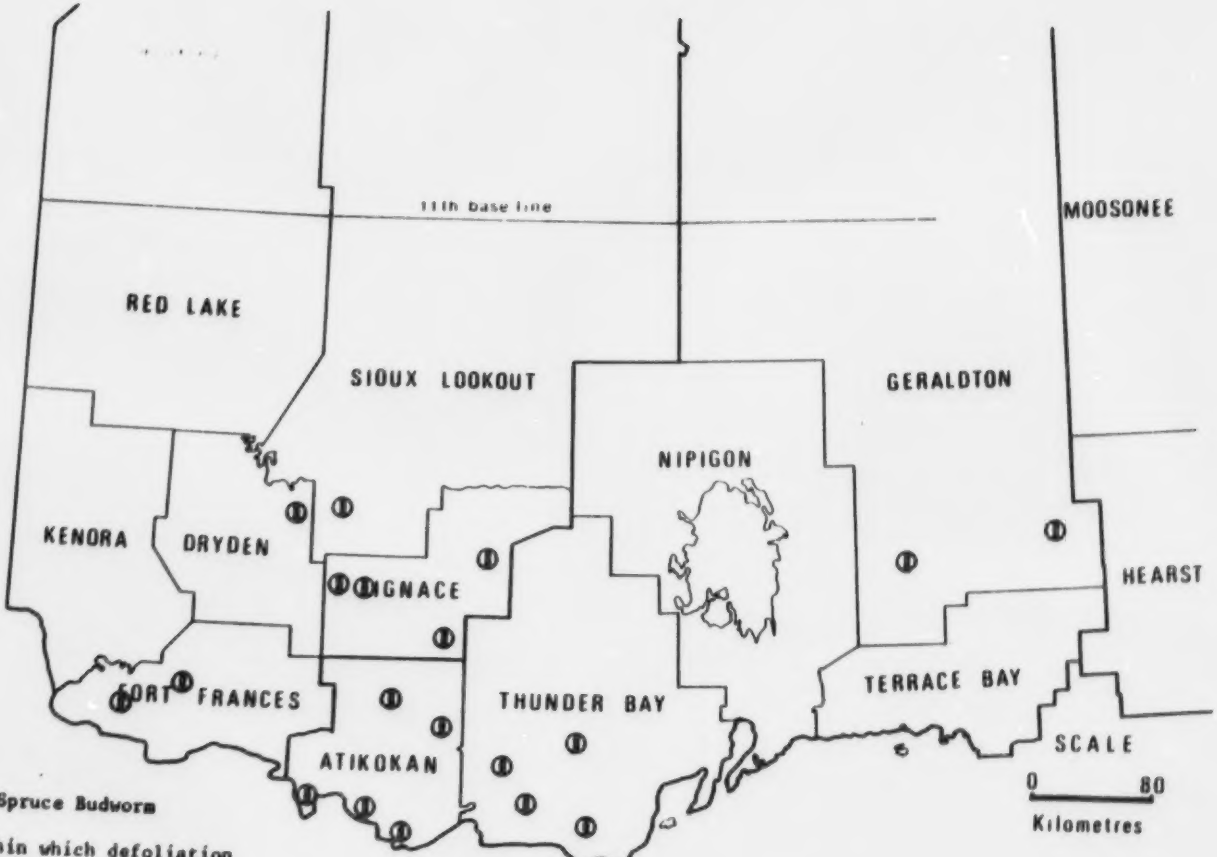
Spruce Budworm

Areas within which defoliation
occurred in 1964

LEGEND

Light defoliation Ⓘ

NORTHWESTERN ONTARIO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THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
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Kilometres

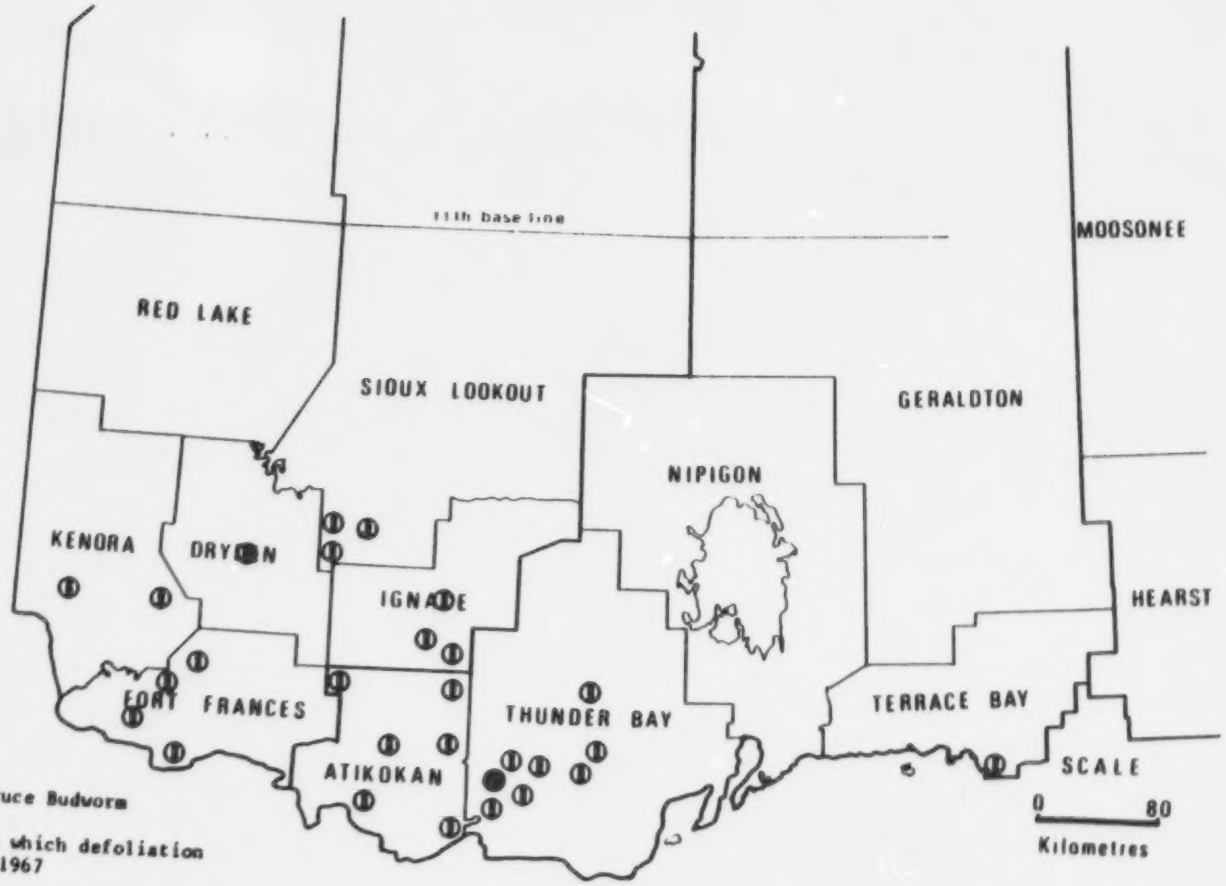
Spruce Budworm

Areas within which defoliation occurred in 1965

LEGEND

Light defoliation ①

NORTHWESTERN ONTARIO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THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

Spruce Budworm

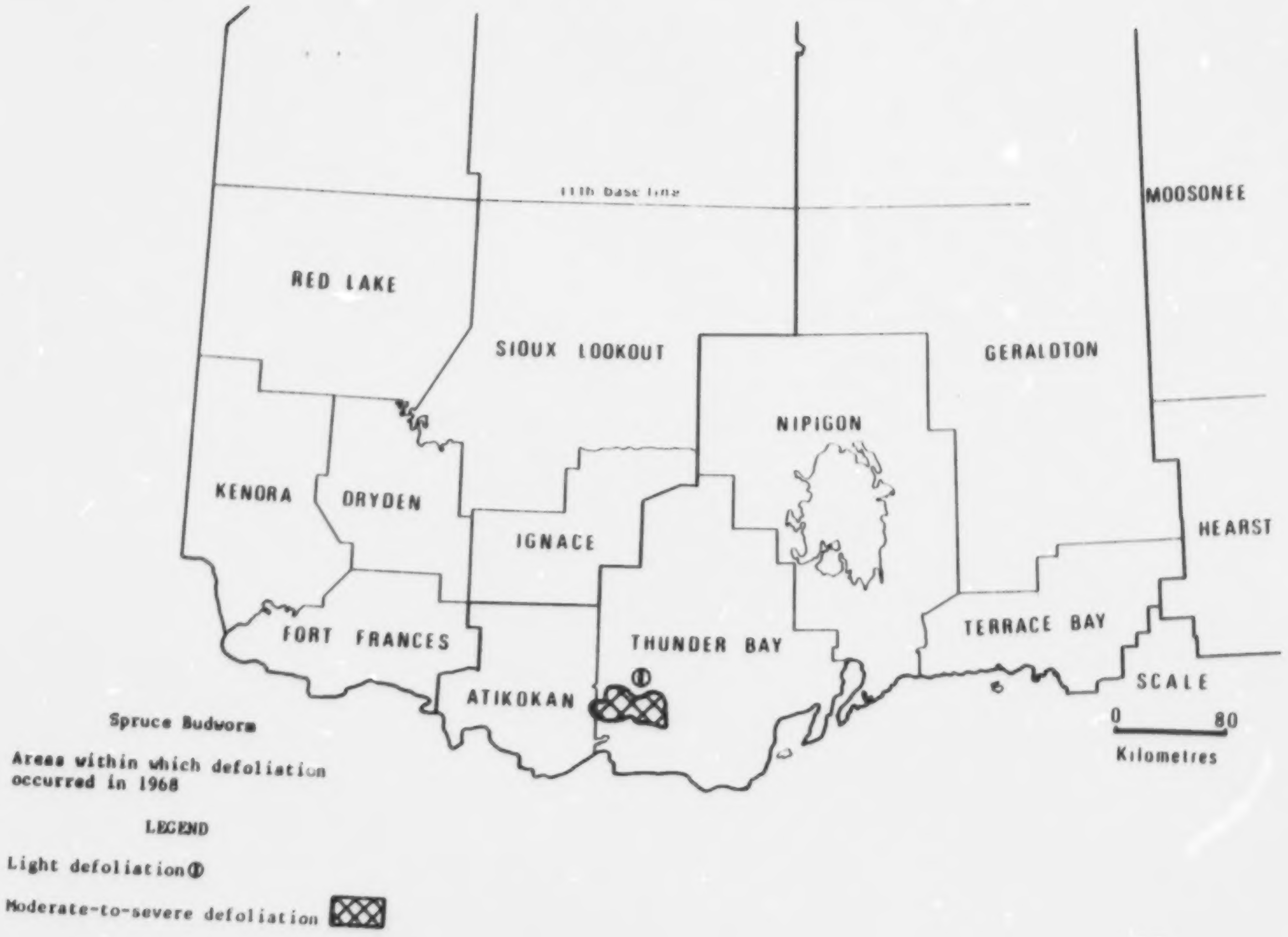
Areas within which defoliation occurred in 1967

LEGEND

Light defoliation ⦶

Moderate-to-severe defoliation ●

NORTHWESTERN ONTARIO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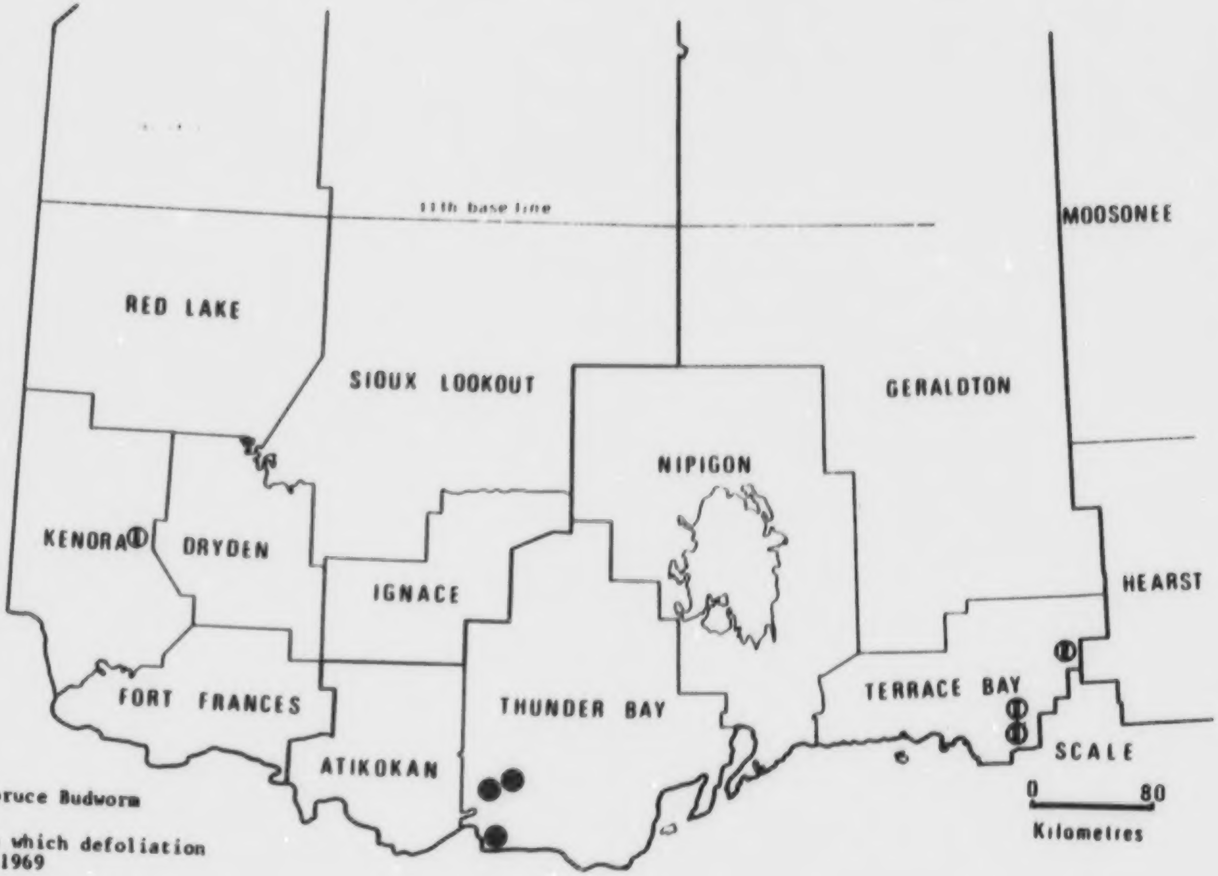
THUNDER BAY
TERRACE BAY
ATIKOKAN
①
SCALE
0
80
Kilometres
Spruce Budworm
Areas within which defoliation occurred in 1968
LEGEND
Light defoliation①
Moderate-to-severe defoliation ▨

NORTHWESTERN ONTARIO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FORT FRANCES
THUNDER BAY
ATIKOKAN
SCALE
0
80
Kilometres

Spruce Budworm

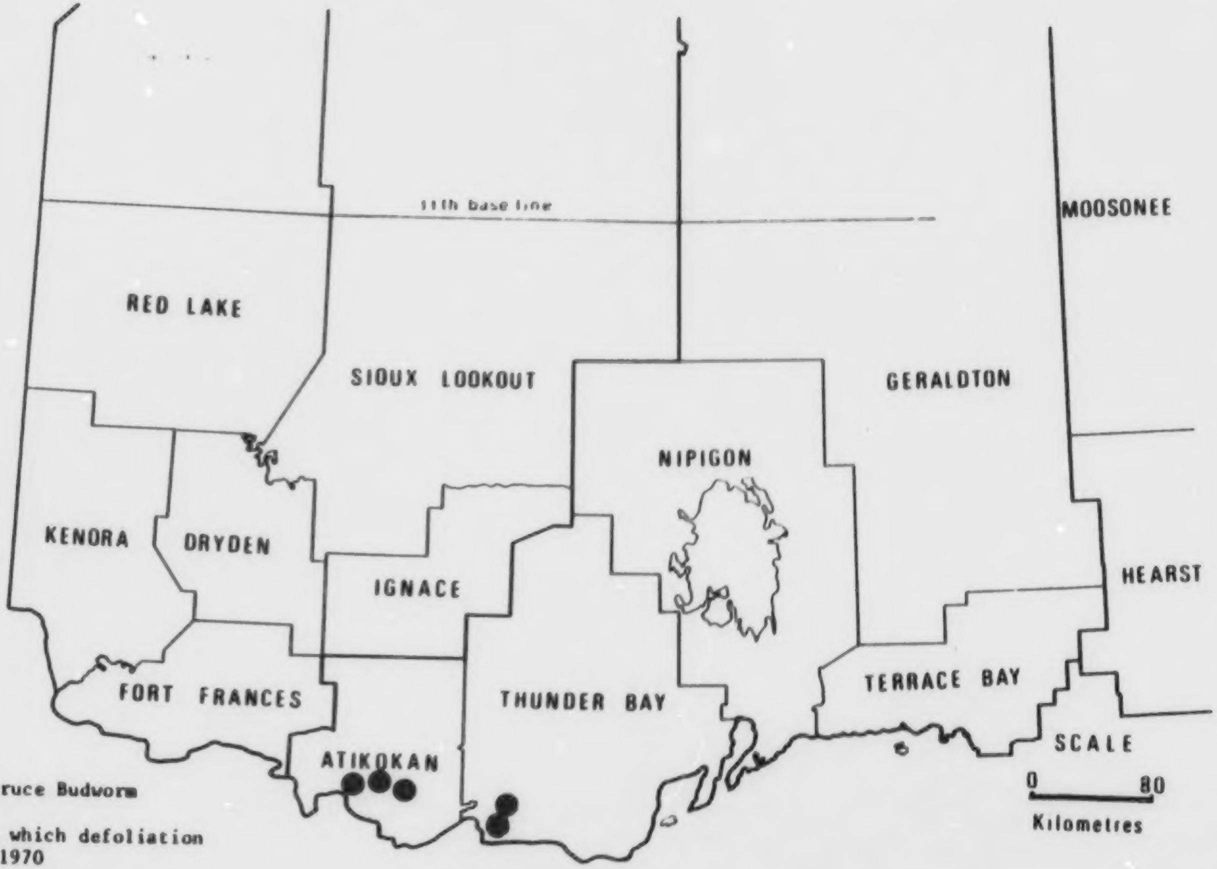
Areas within which defoliation occurred in 1969

LEGEND

Light defoliation Ⓛ

Moderate-to-severe defoliation ●

NORTHWESTERN ONTARIO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HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

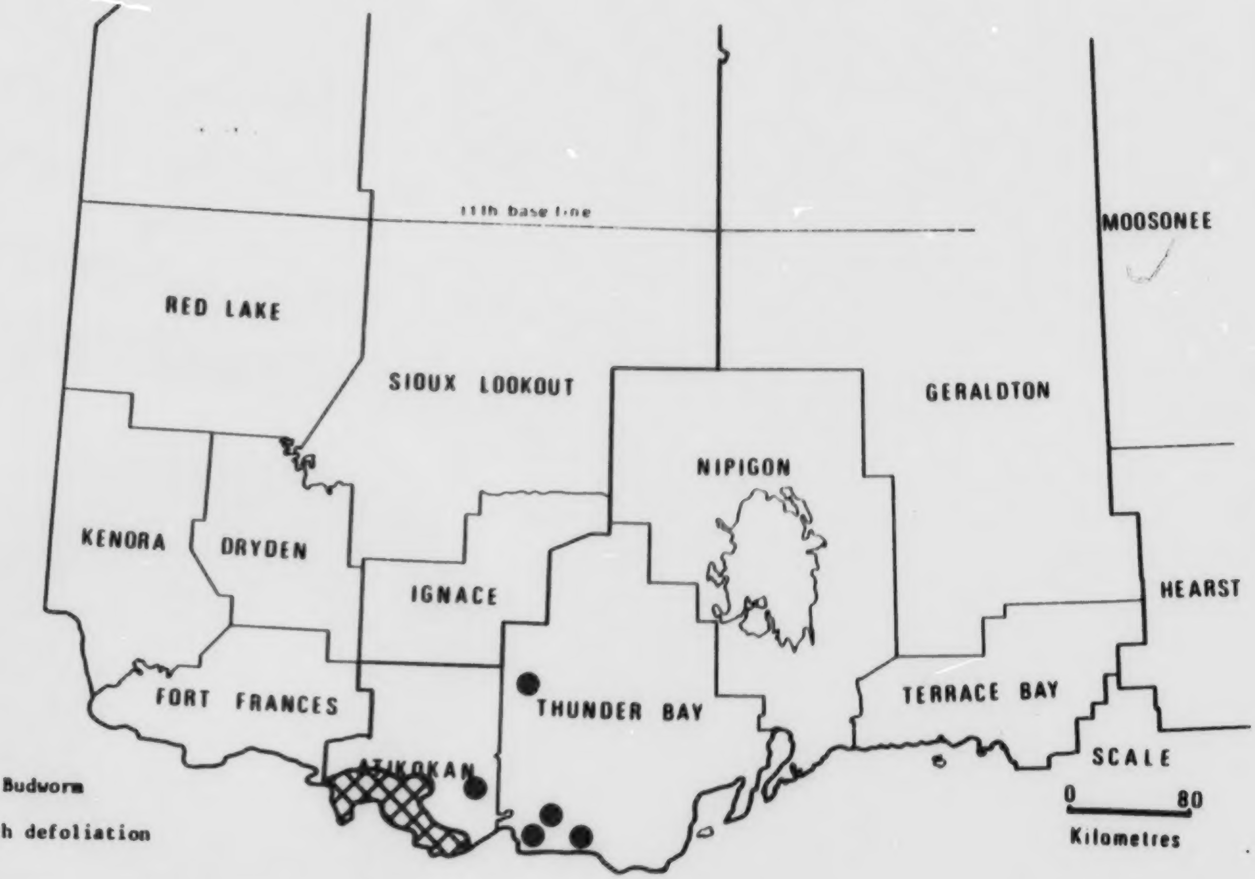
Spruce Budworm

Areas within which defoliation
occurred in 1970

LEGEND

Moderate-to-severe defoliation ●

NORTHWESTERN ONTARIO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HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

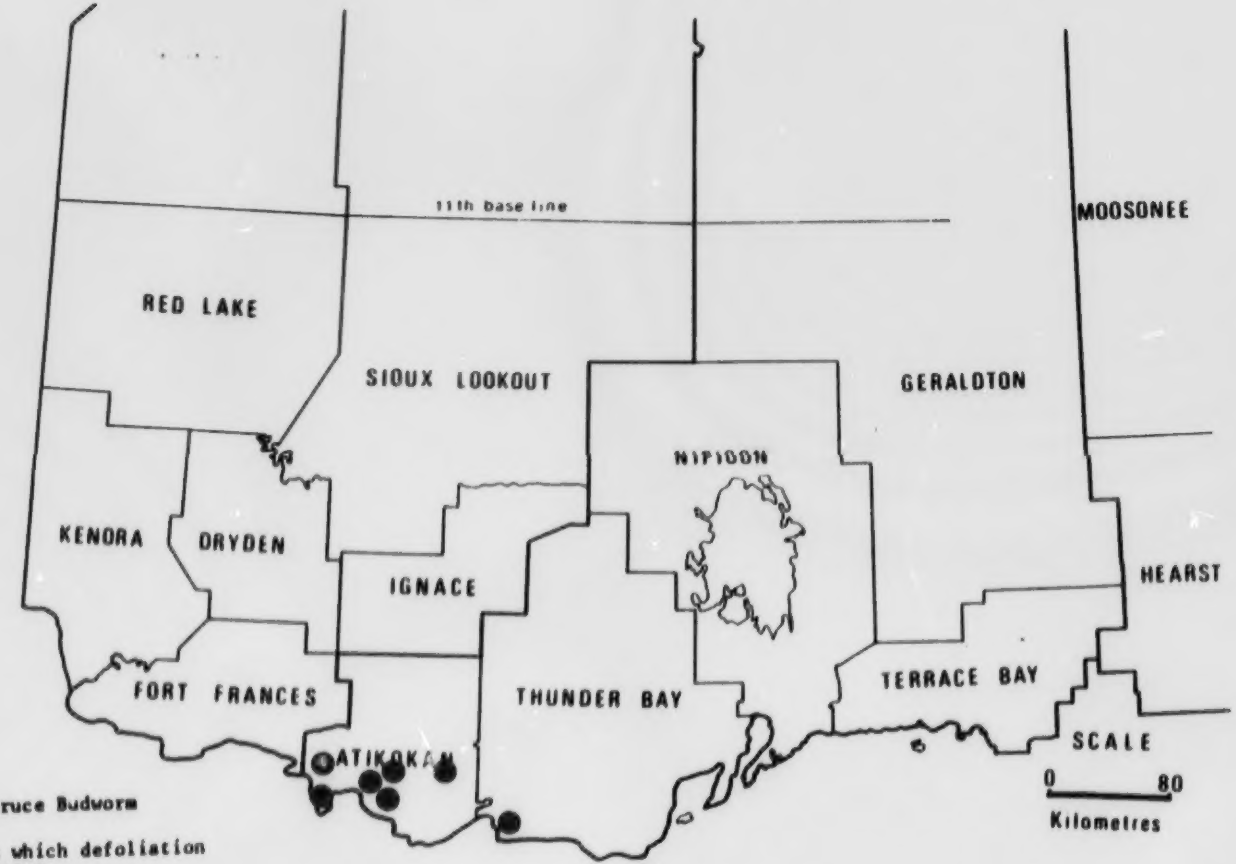
Spruce Budworm

Areas within which defoliation occurred in 1971

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

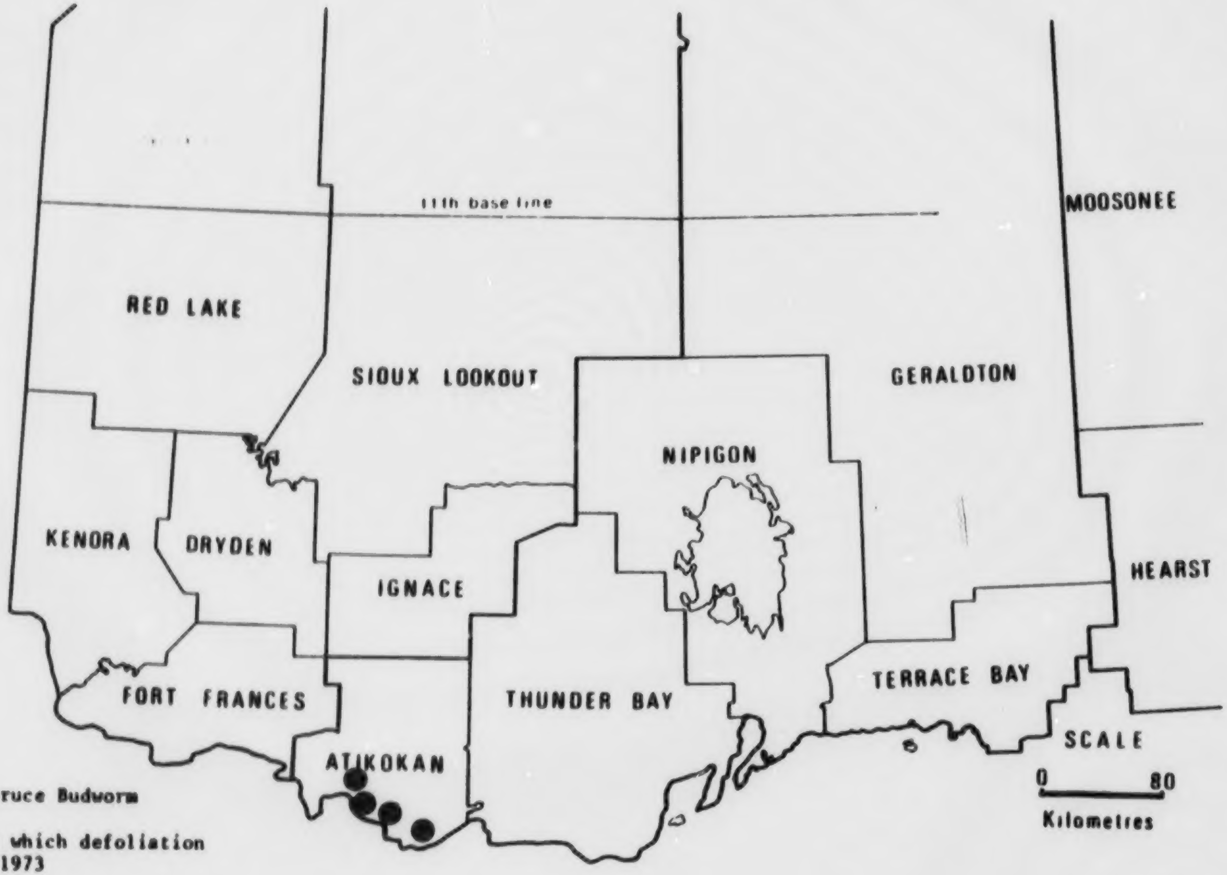
Spruce Budworm

Areas within which defoliation
occurred in 1972

LEGEND

Moderate-to-severe defoliation ●

NORTHWESTERN ONTARIO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HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

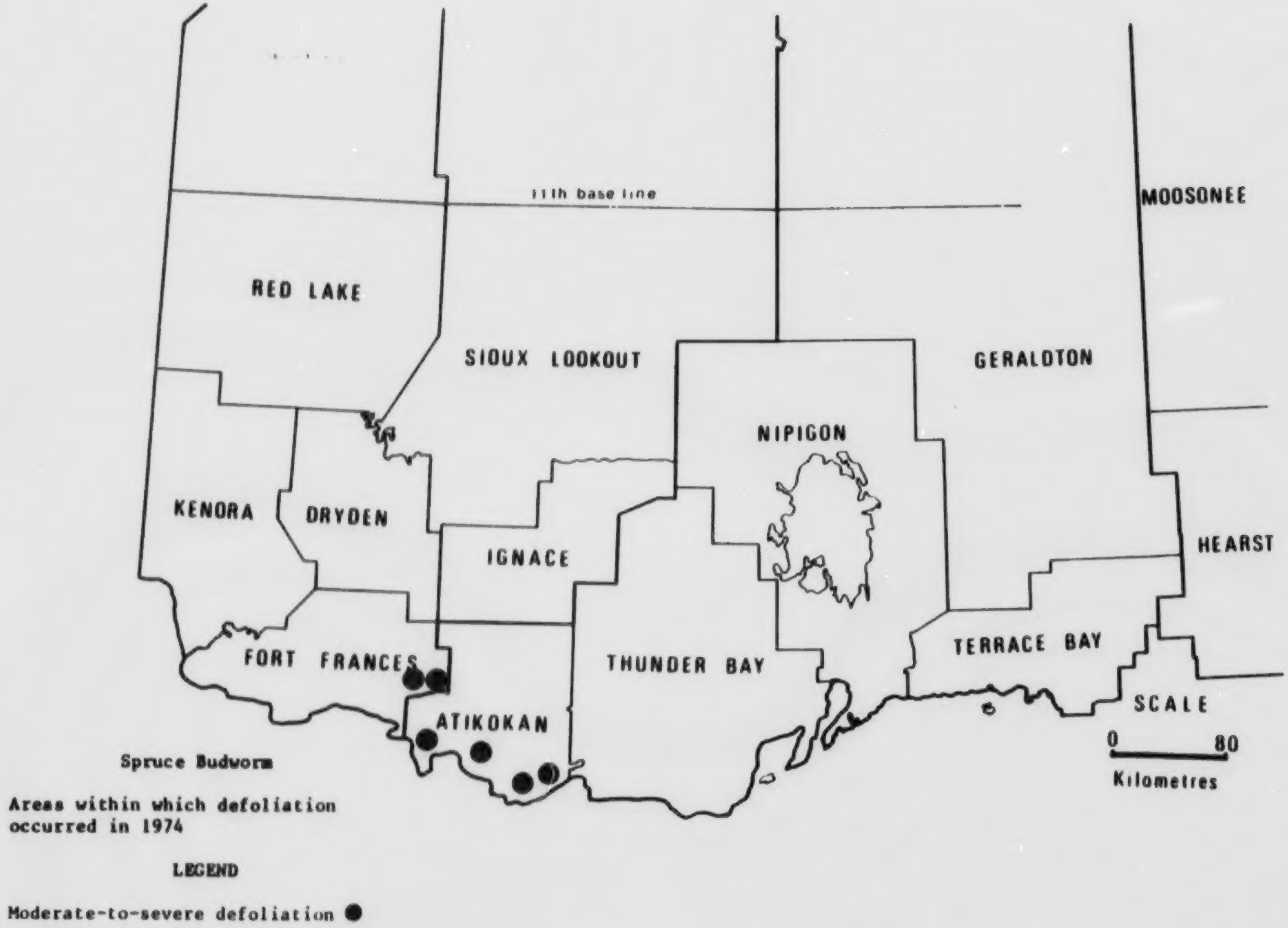
Spruce Budworm

Areas within which defoliation
occurred in 1973

LEGEND

Moderate-to-severe defoliation ●

NORTHWESTERN ONTARIO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HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

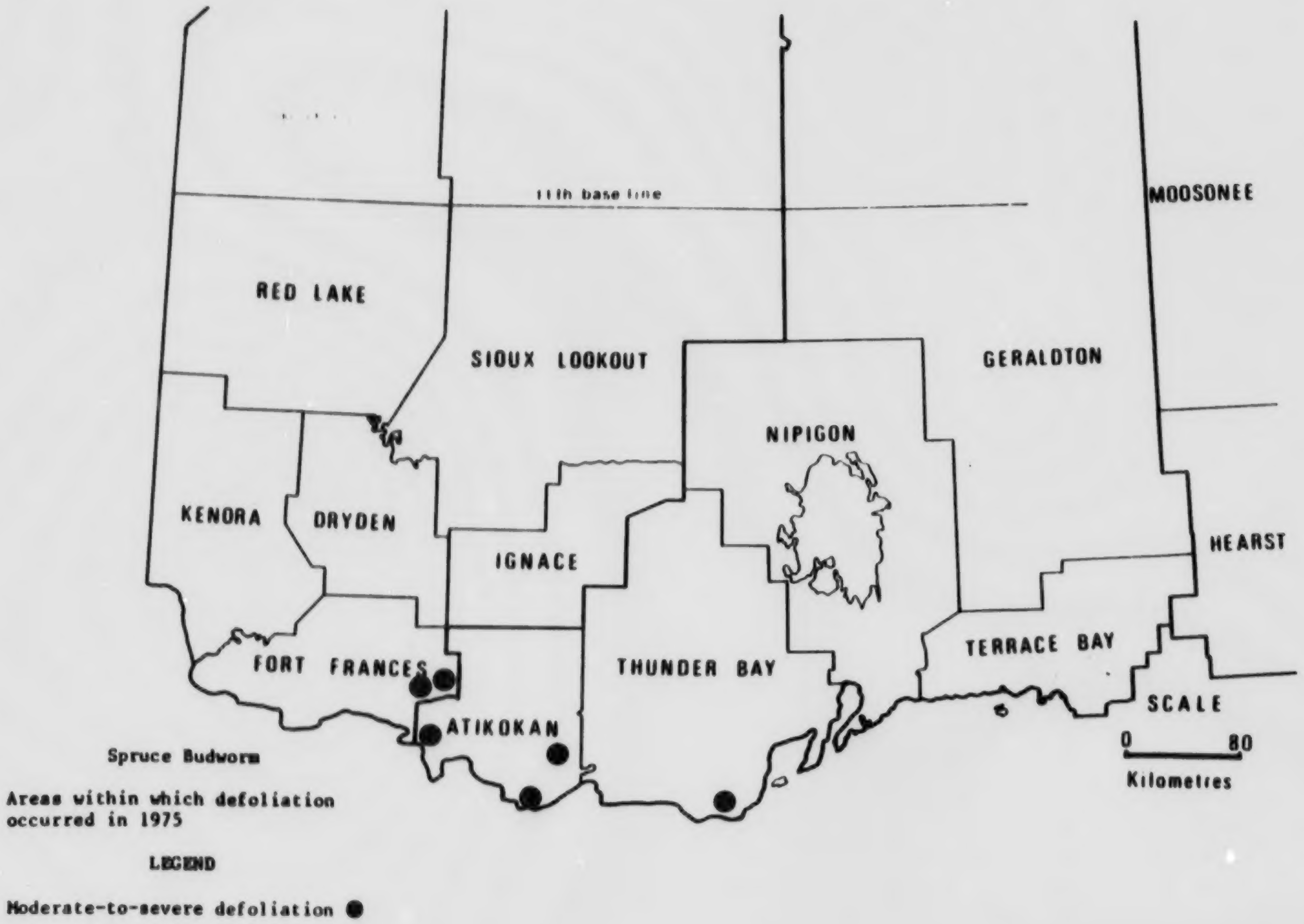
Spruce Budworm

Areas within which defoliation occurred in 1974

LEGEND

Moderate-to-severe defoliation ●

NORTHWESTERN ONTARIO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FORT FRANCES
TERRACE BAY
THUNDER BAY
ATIKOKAN
SCALE
0
80
Kilometres

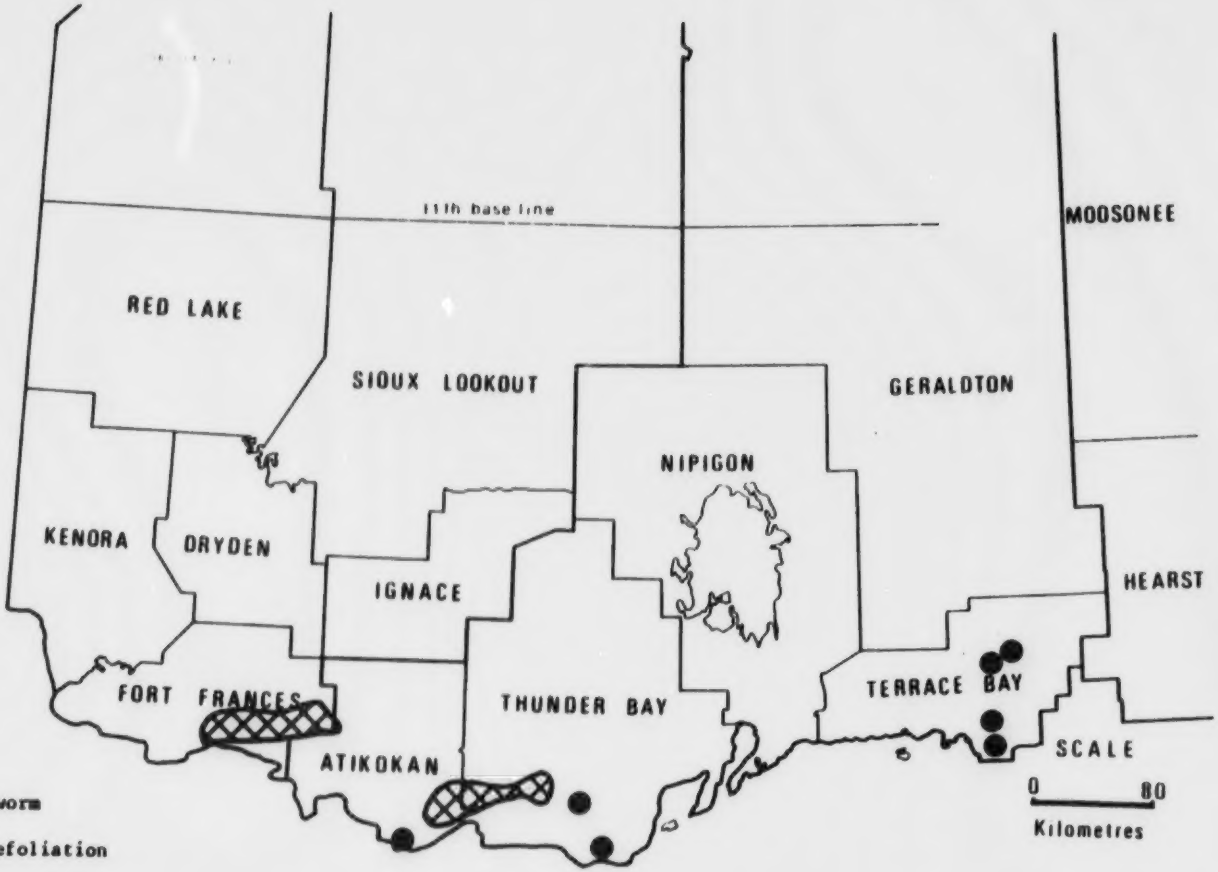
Spruce Budworm

Areas within which defoliation
occurred in 1975

LEGEND

Moderate-to-severe defoliation ●

NORTHWESTERN ONTARIO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TERRACE BAY
THUNDER BAY
ATIKOKAN
SCALE
0
80
Kilometres

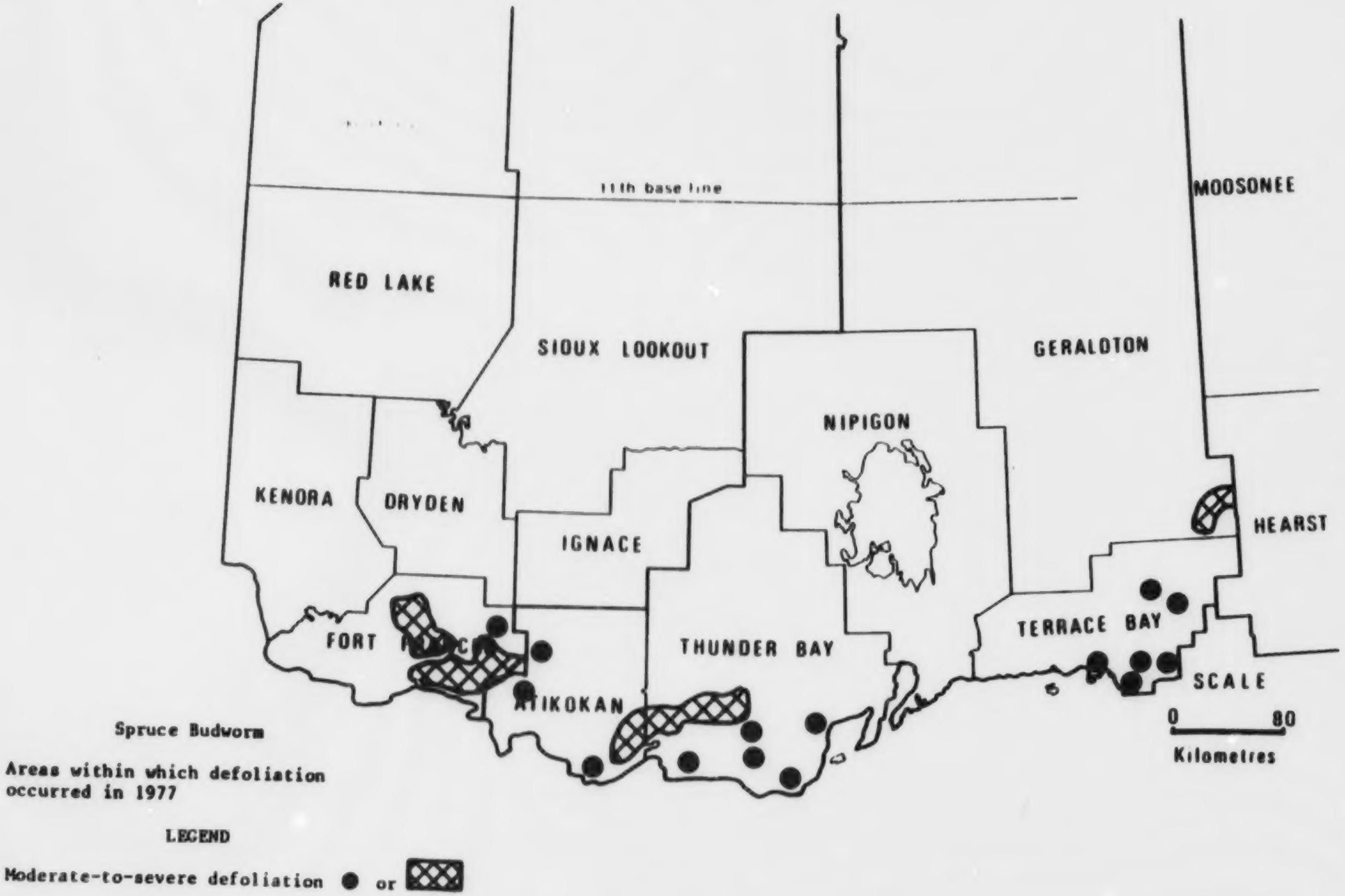
Spruce Budworm

Areas within which defoliation
occurred in 1976

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

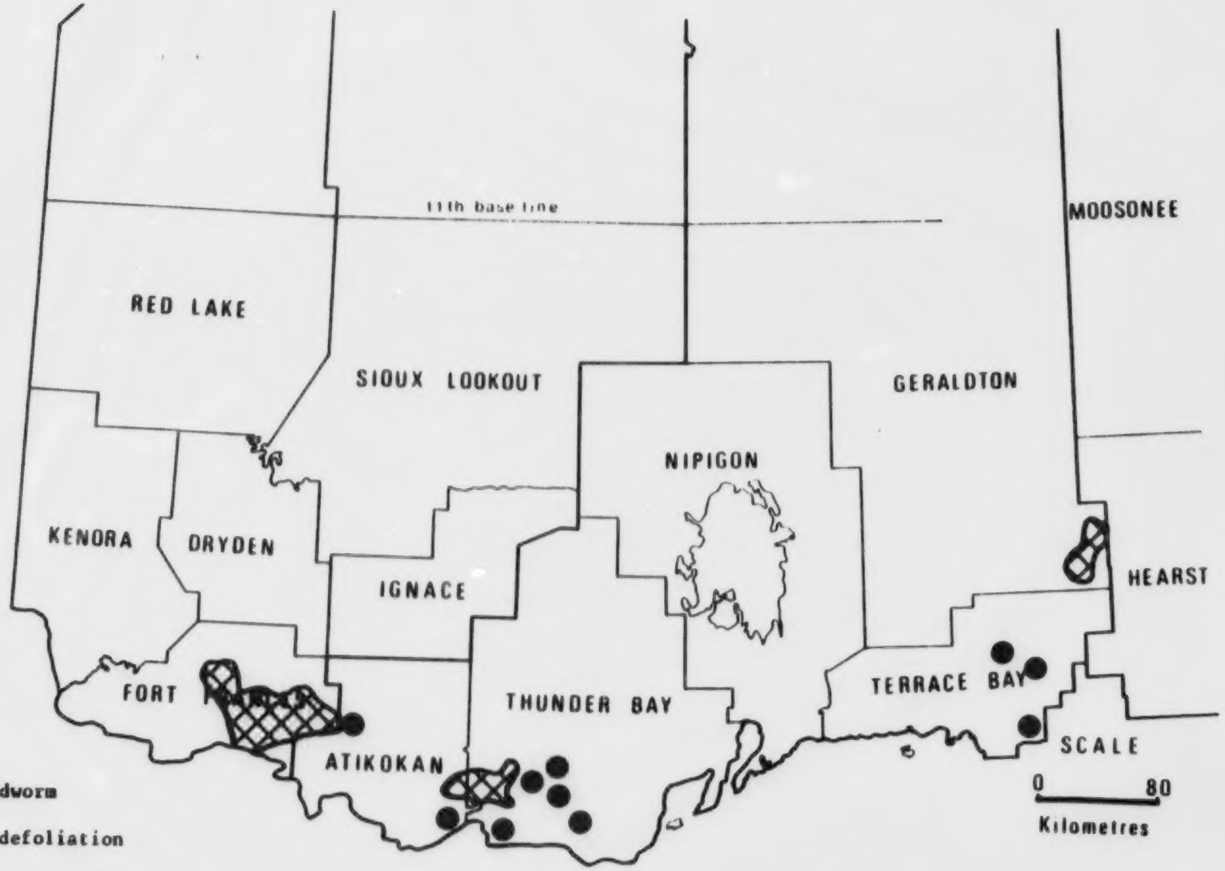
Spruce Budworm

Areas within which defoliation occurred in 1977

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

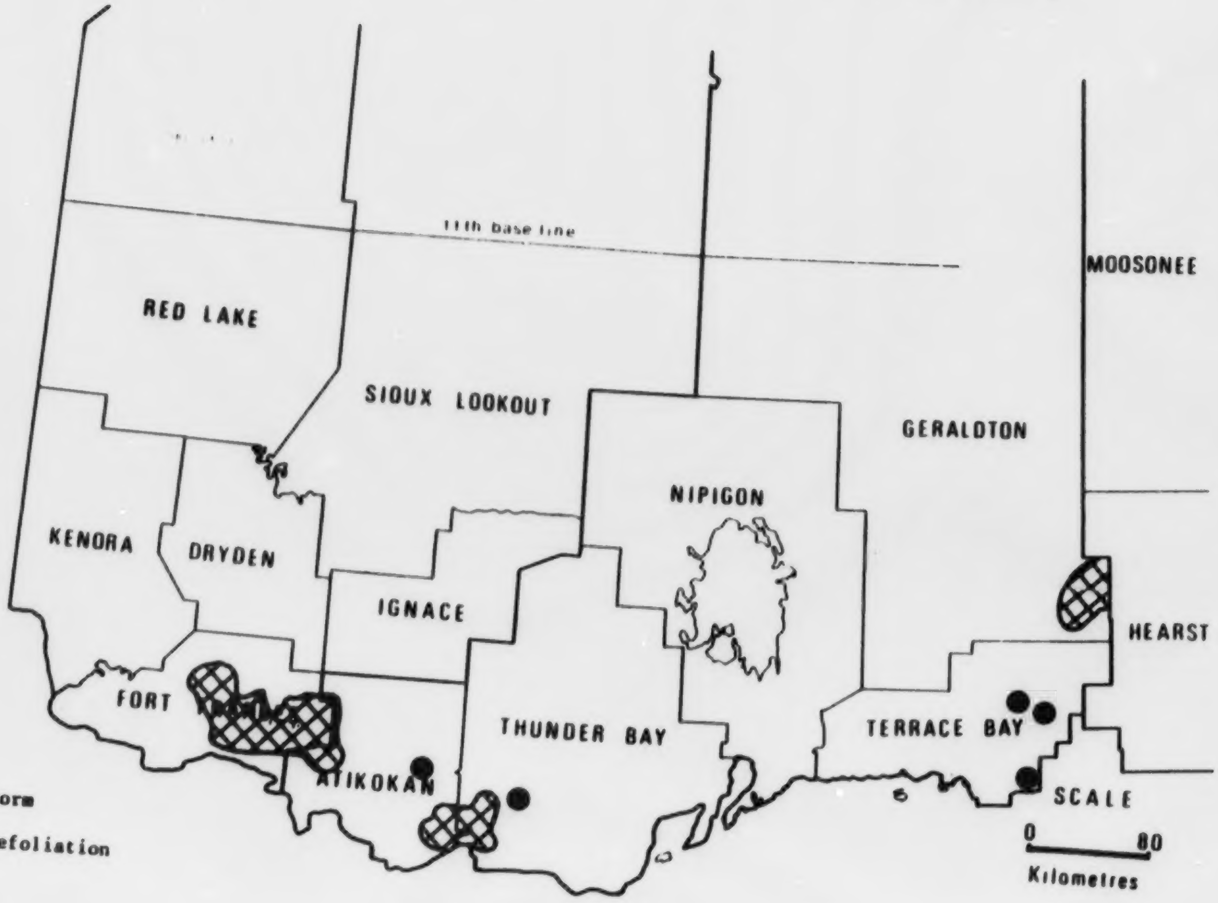
Spruce Budworm

Areas within which defoliation
occurred in 1978

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

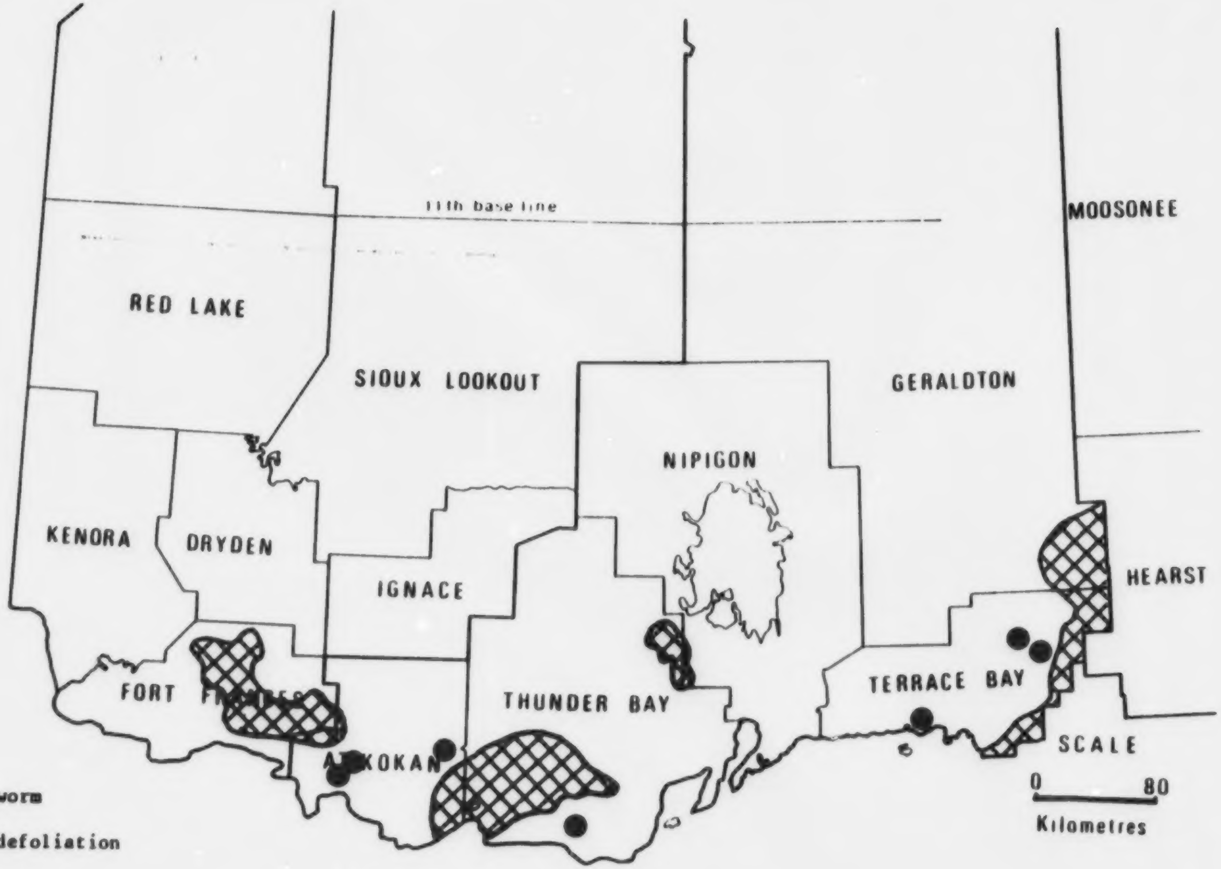
Spruce Budworm

Areas within which defoliation occurred in 1979

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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THUNDER BAY
TERRACE BAY
A KOKAN
SCALE
0
80
Kilometres

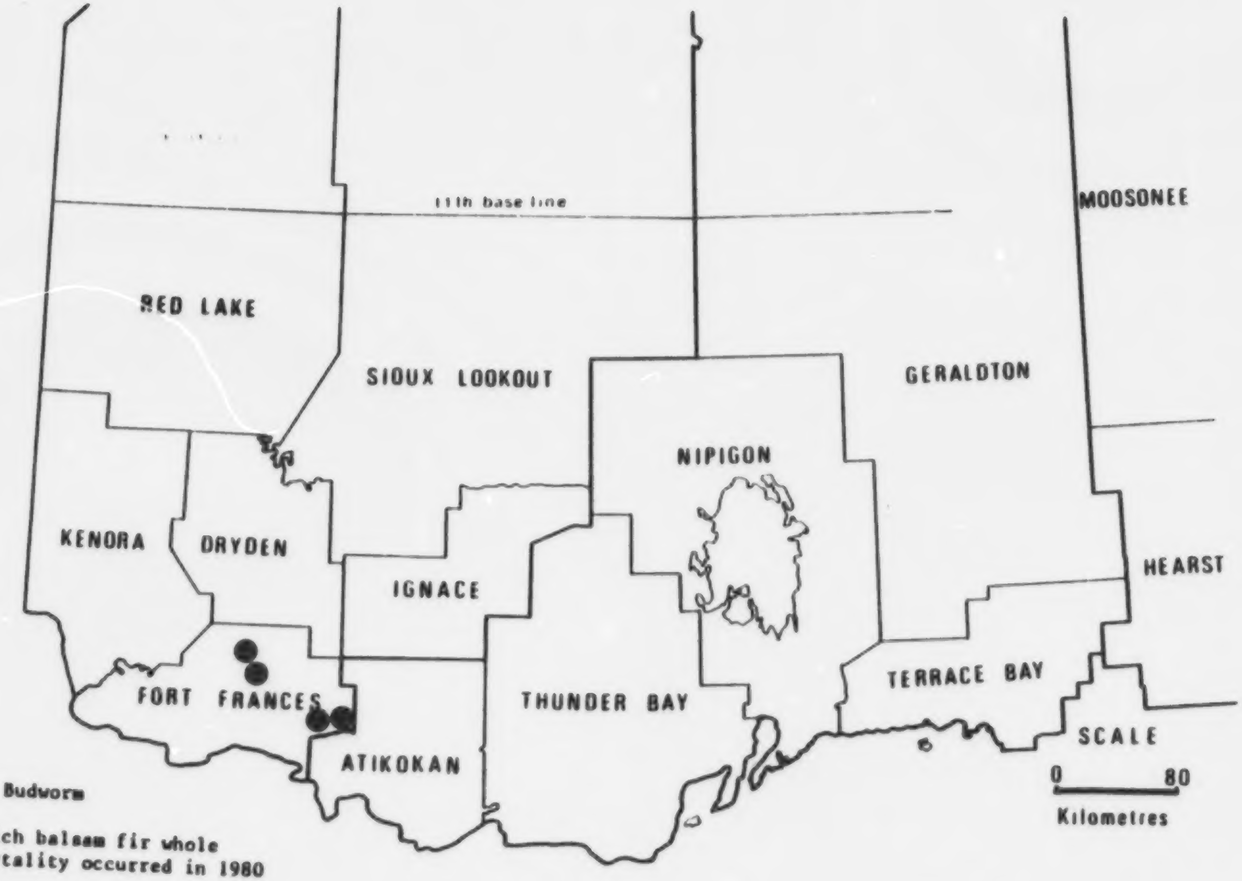
Spruce Budworm

Areas within which defoliation
occurred in 1980

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

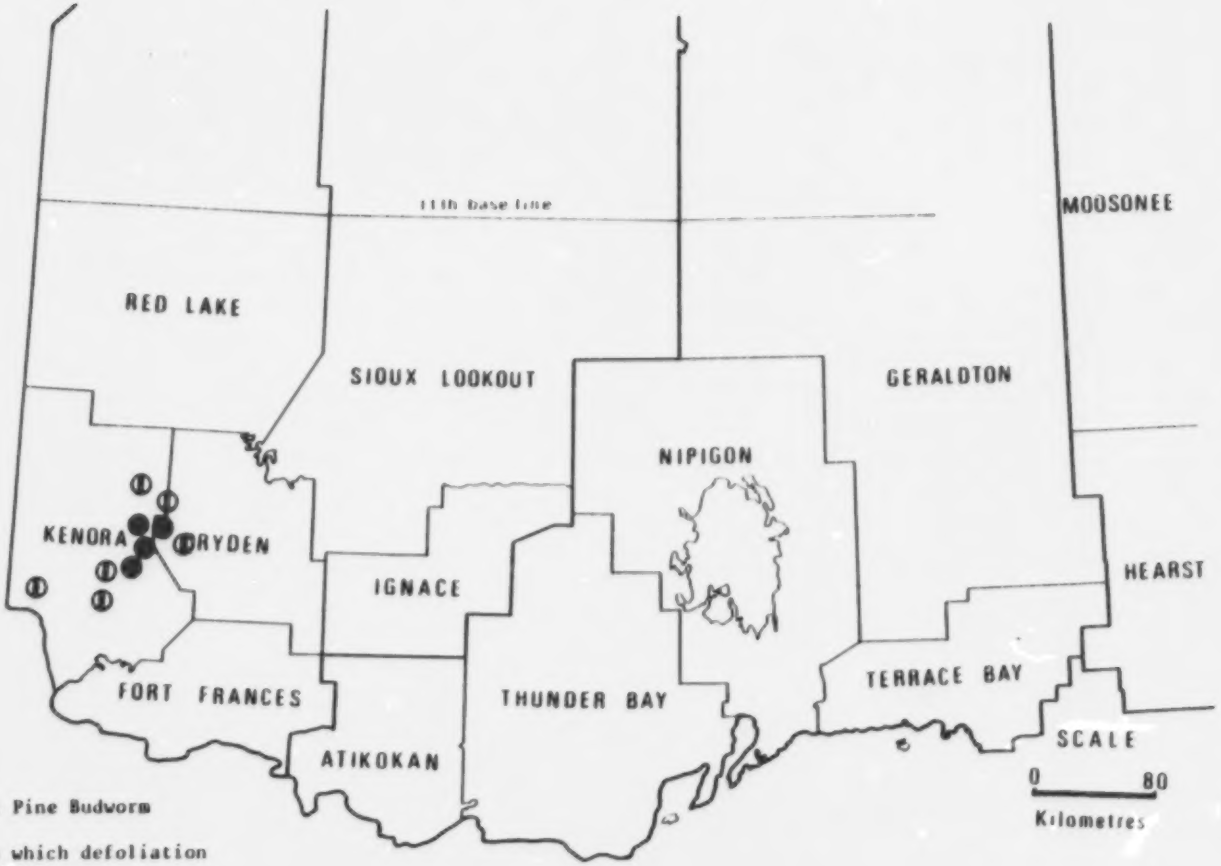
Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1980

LEGEND

Mortality ●

NORTHWESTERN ONTARIO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FORT FRANCES
THUNDER BAY
ATIKOKAN
SCALE
0
80
Kilometres

Jack Pine Budworm

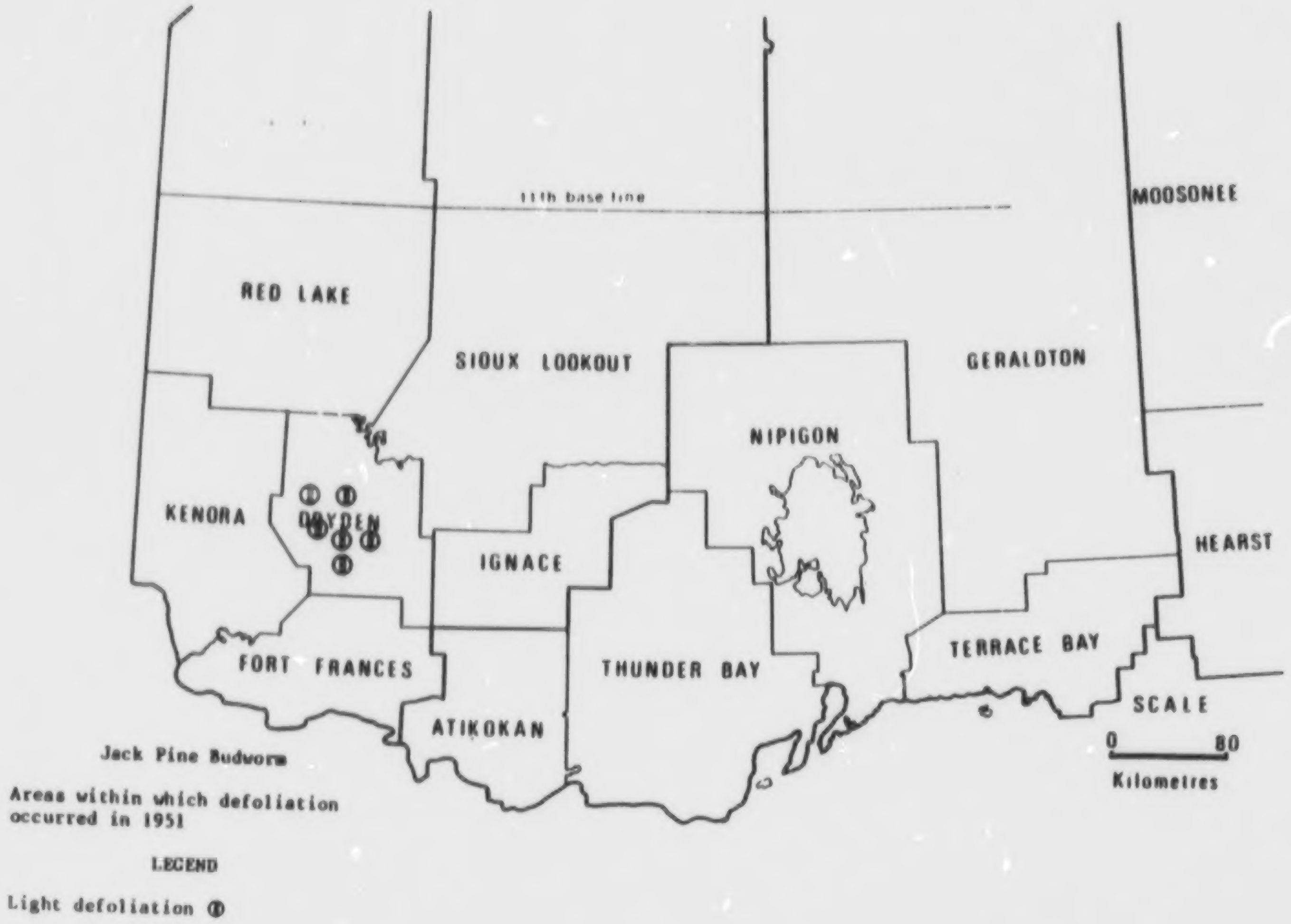
Areas within which defoliation occurred in 1950

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ●

NORTHWESTERN ONTARIO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TERRACE BAY
FORT FRANCES
THUNDER BAY
ATIKOKAN
SCALE
0
80
Kilometres

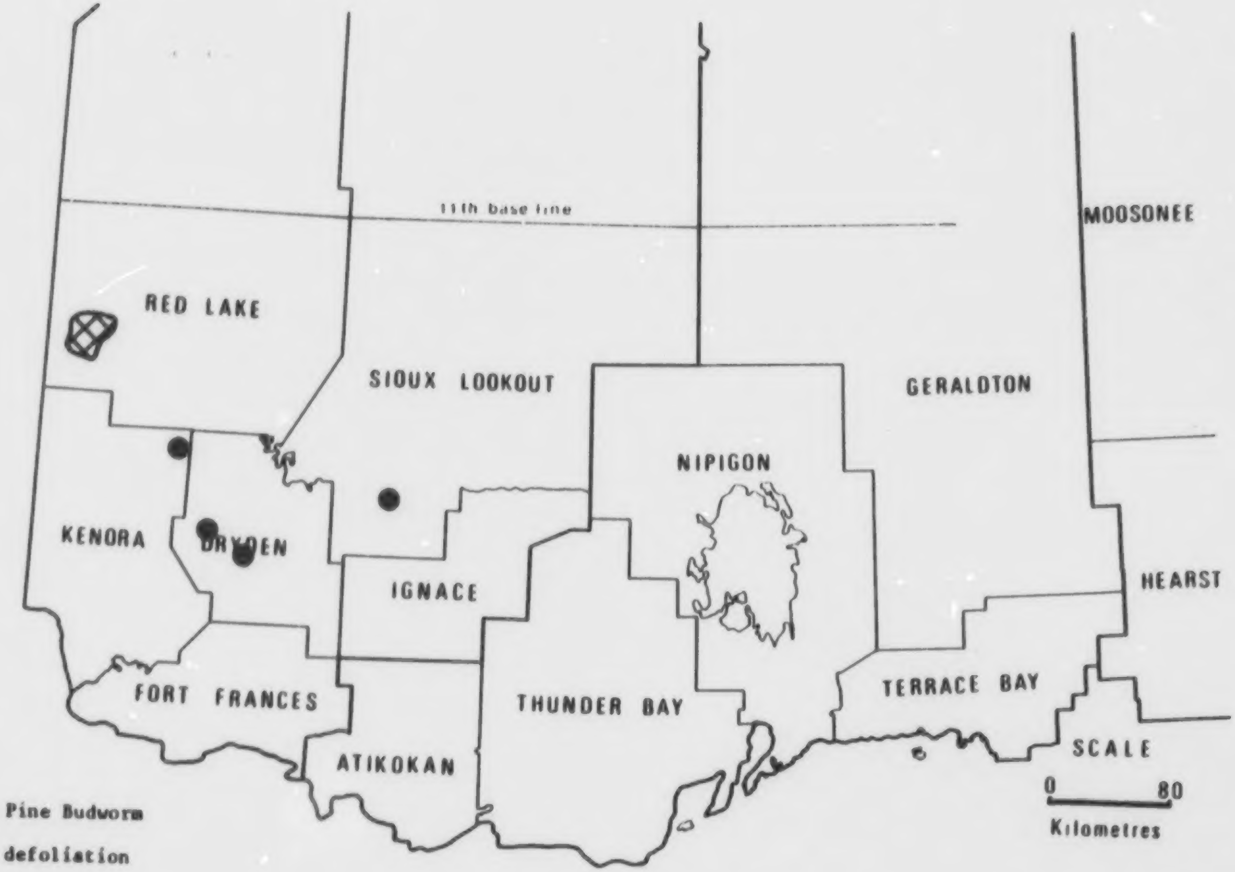
Jack Pine Budworm

Areas within which defoliation occurred in 1951

LEGEND

Light defoliation Ⓛ

NORTHWESTERN ONTARIO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FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

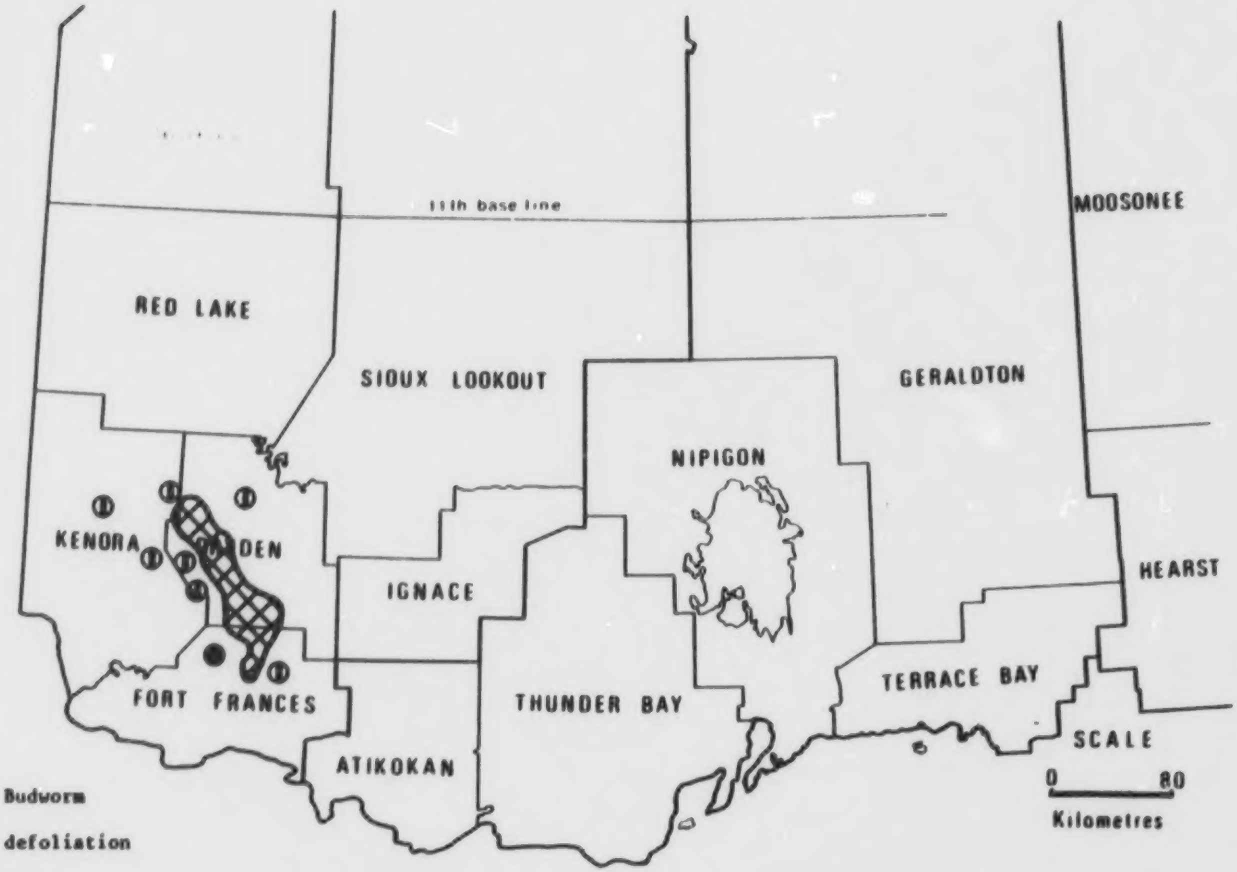
Jack Pine Budworm

Areas within which defoliation
occurred in 1954

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO



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FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

Jack Pine Budworm

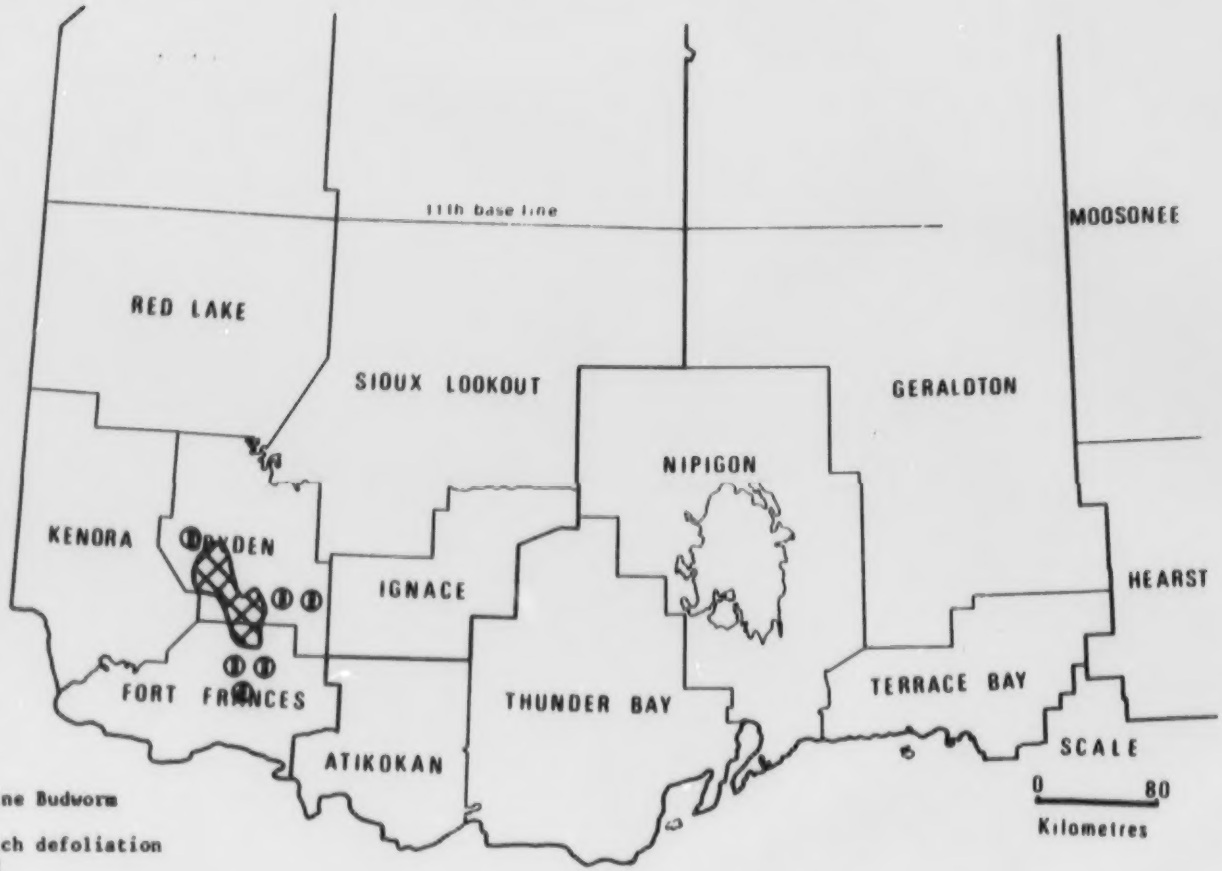
Areas within which defoliation
occurred in 1961

LEGEND

Light defoliation ① or

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

Jack Pine Budworm

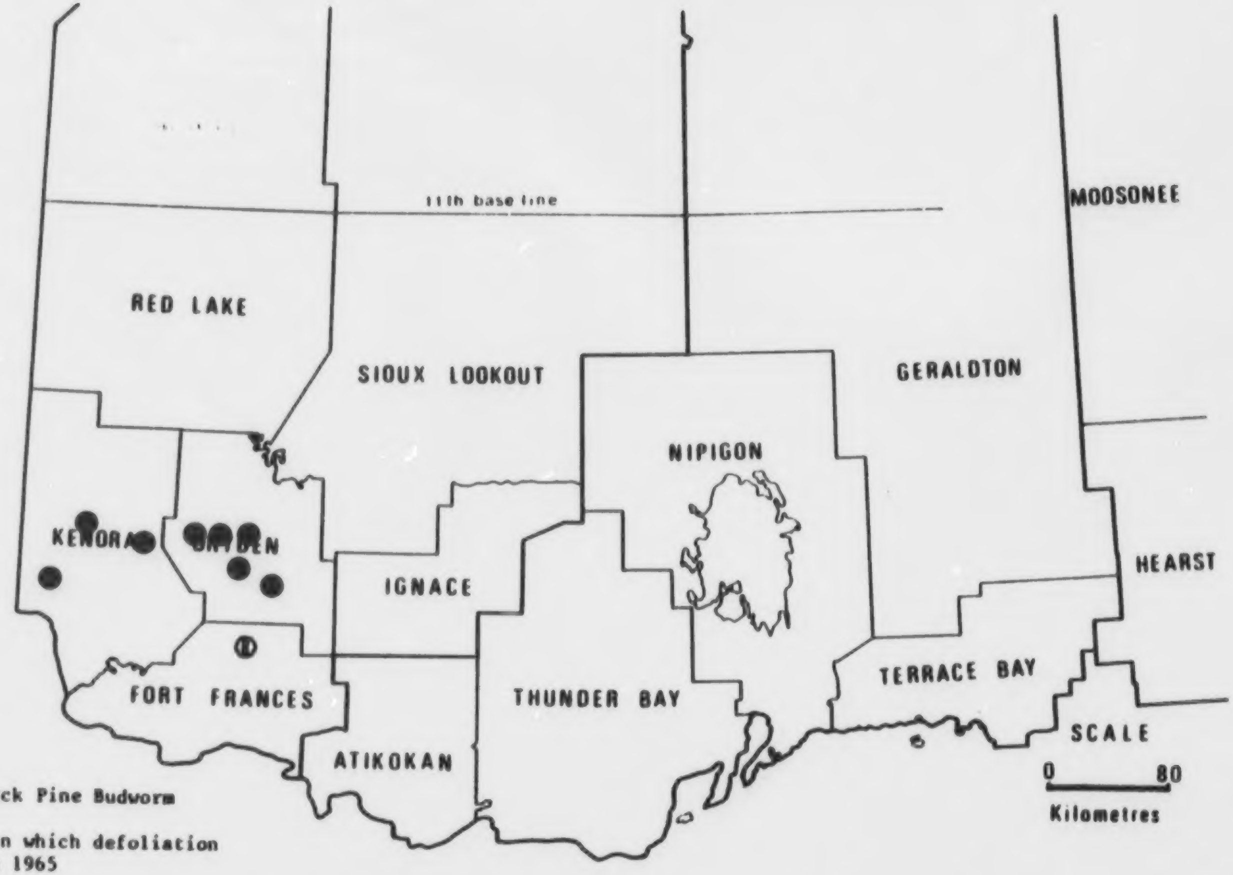
Areas within which defoliation occurred in 1962

LEGEND

Light defoliation ①

Moderate-to-severe defoliation ▨

NORTHWESTERN ONTARIO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TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

Jack Pine Budworm

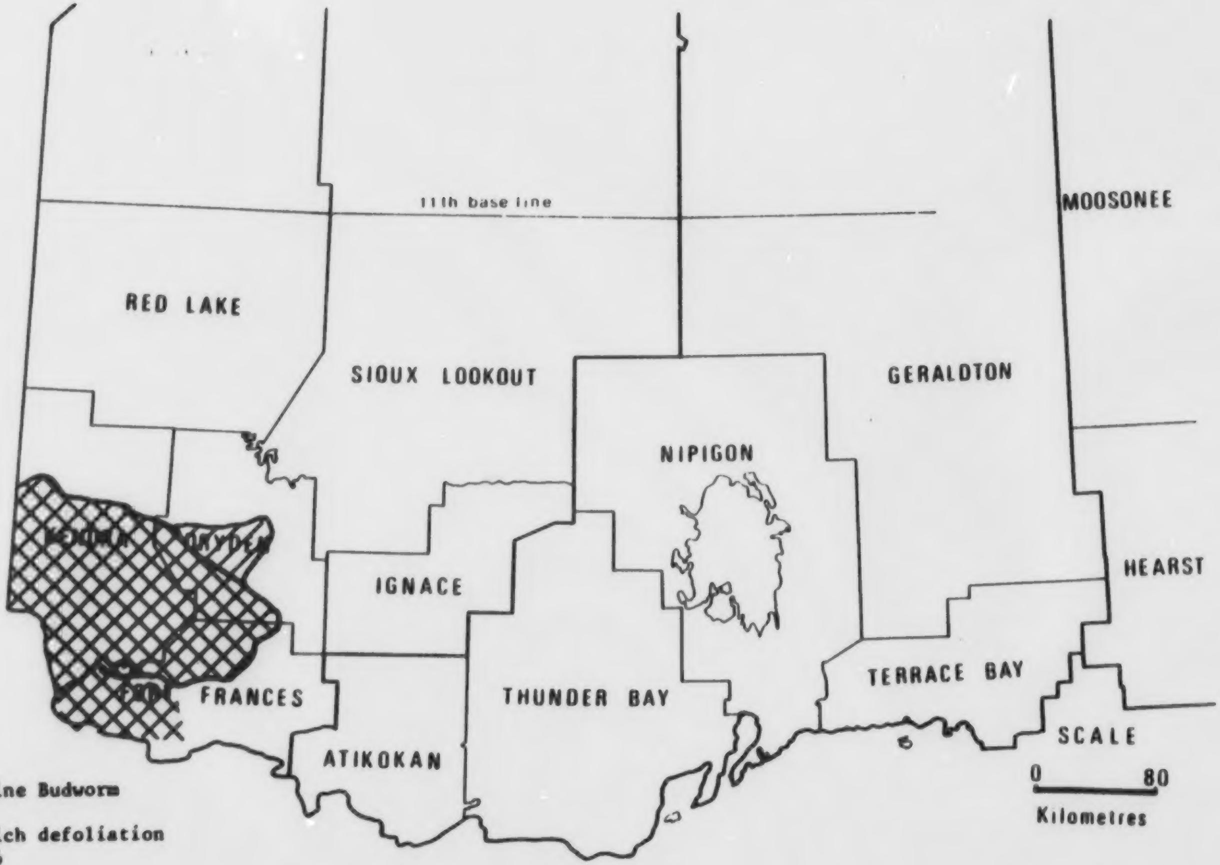
Areas within which defoliation occurred in 1965

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ●

NORTHWESTERN ONTARIO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TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

Jack Pine Budworm

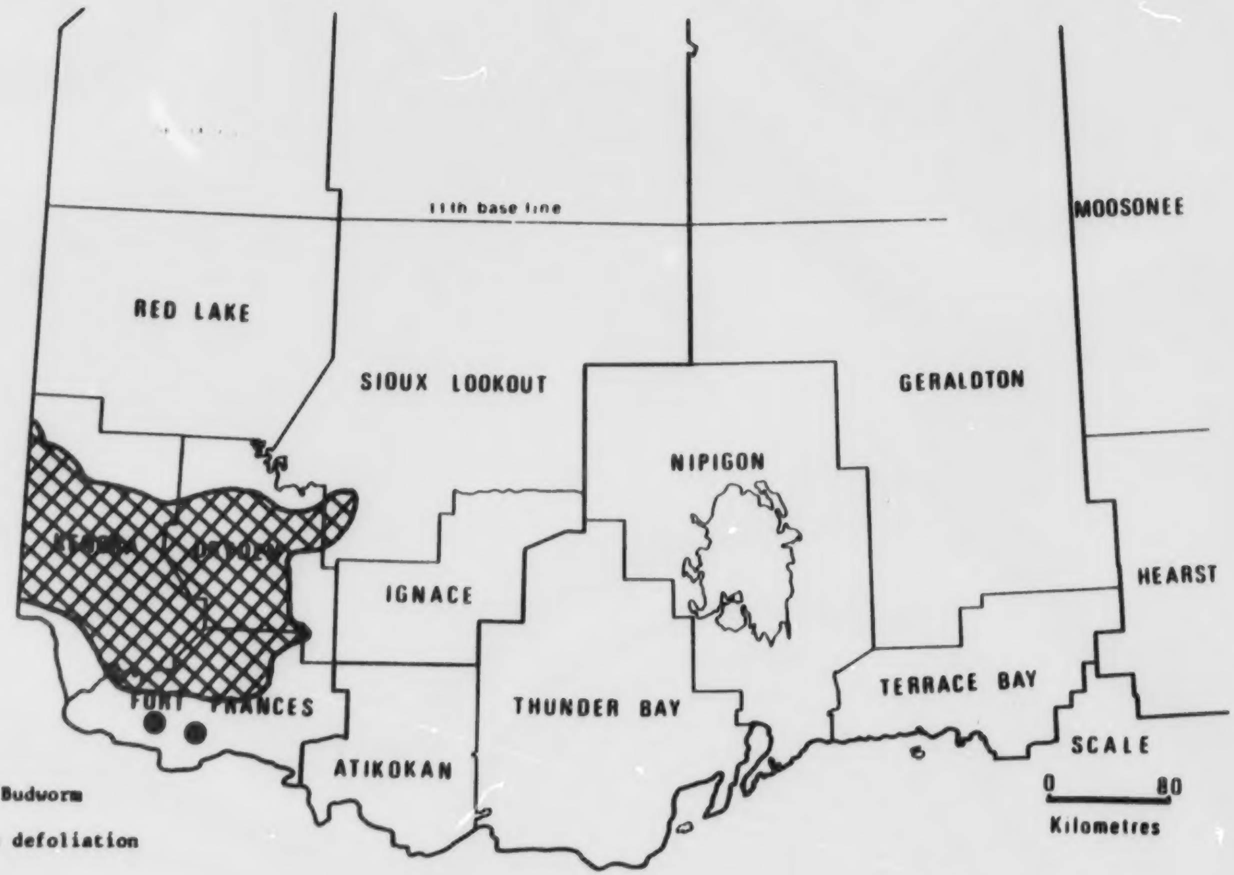
Areas within which defoliation
occurred in 1966

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ▦

NORTHWESTERN ONTARIO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FORT FRANCES
ATIKOKAN
SCALE
0
80
Kilometres

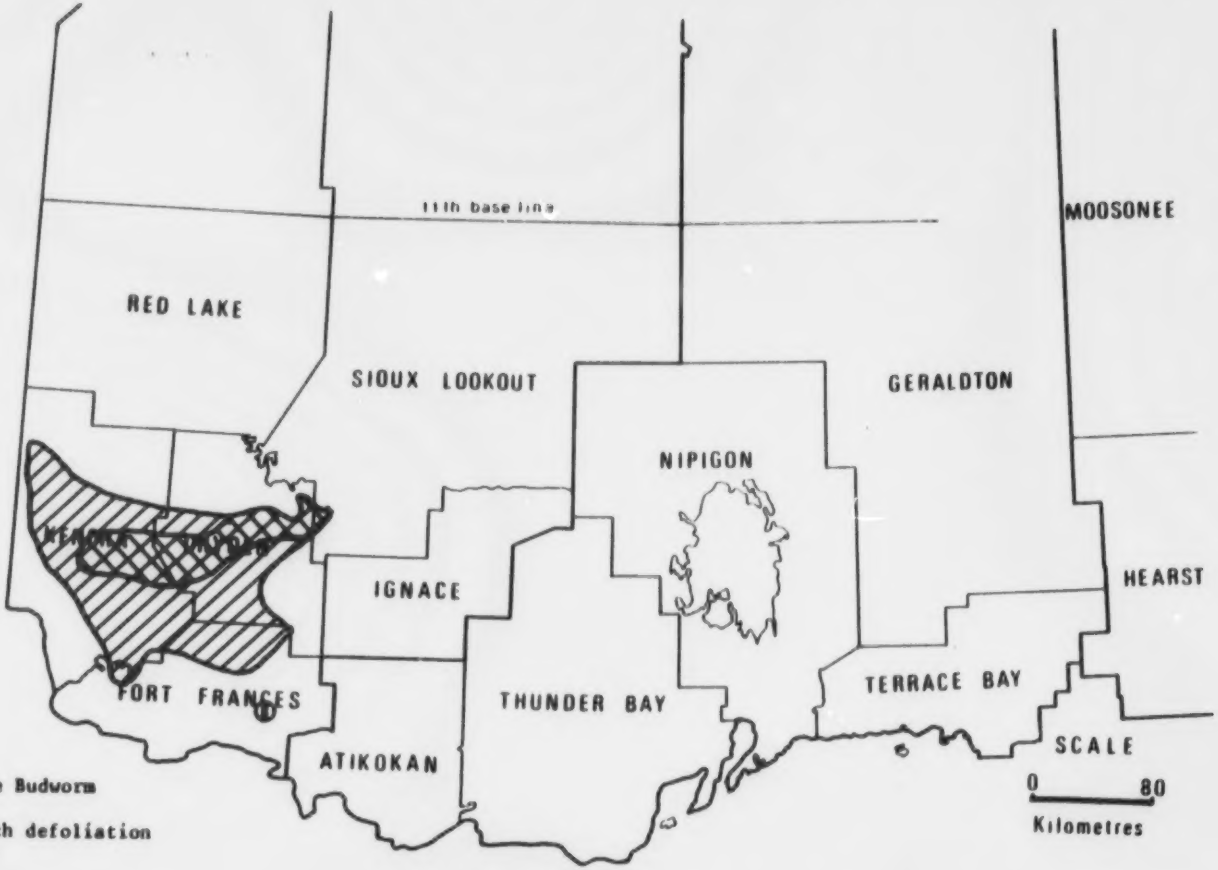
Jack Pine Budworm

Areas within which defoliation
occurred in 1967

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

Jack Pine Budworm

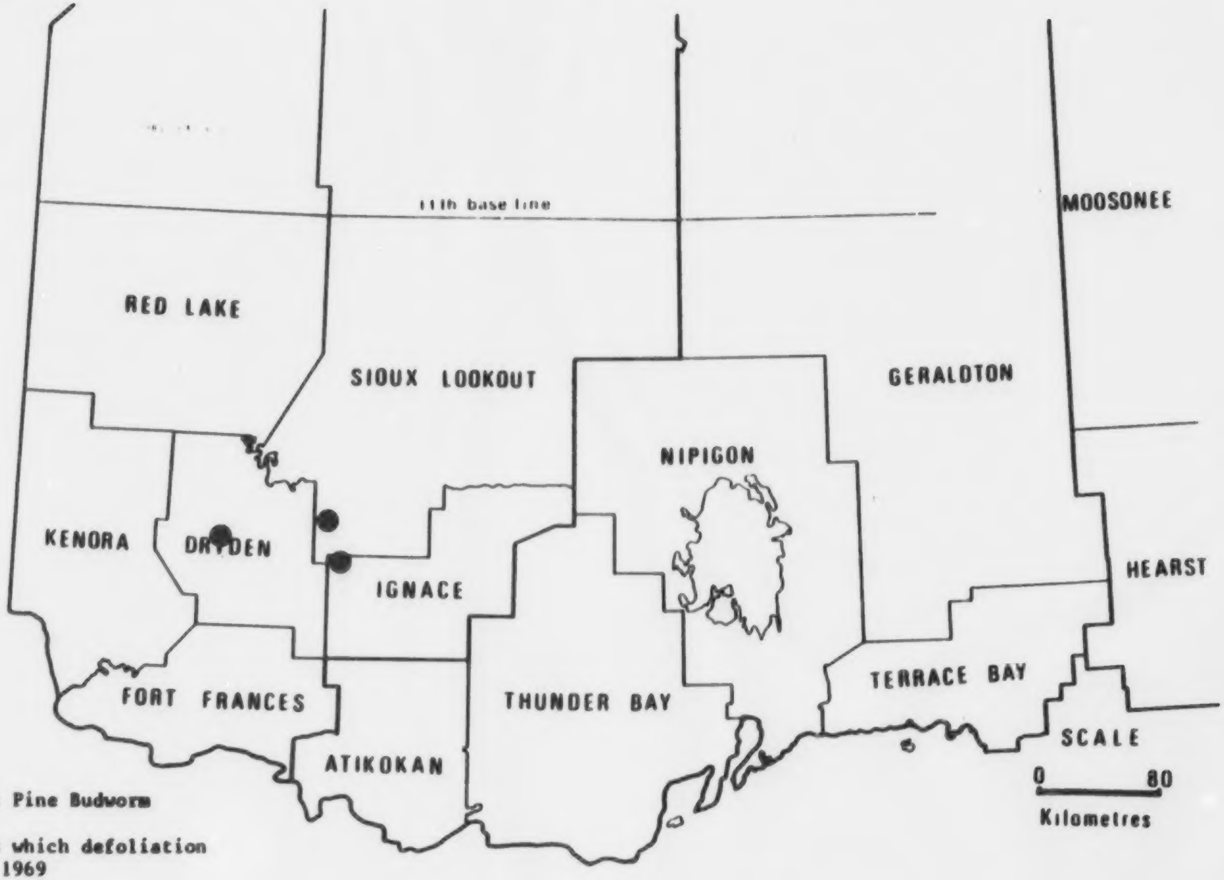
Areas within which defoliation
occurred in 1968

LEGEND

Light defoliation ① or ▨

Moderate-to-severe defoliation ▩

NORTHWESTERN ONTARIO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THUNDER BAY
ATIKOKAN
SCALE
0
80
Kilometres

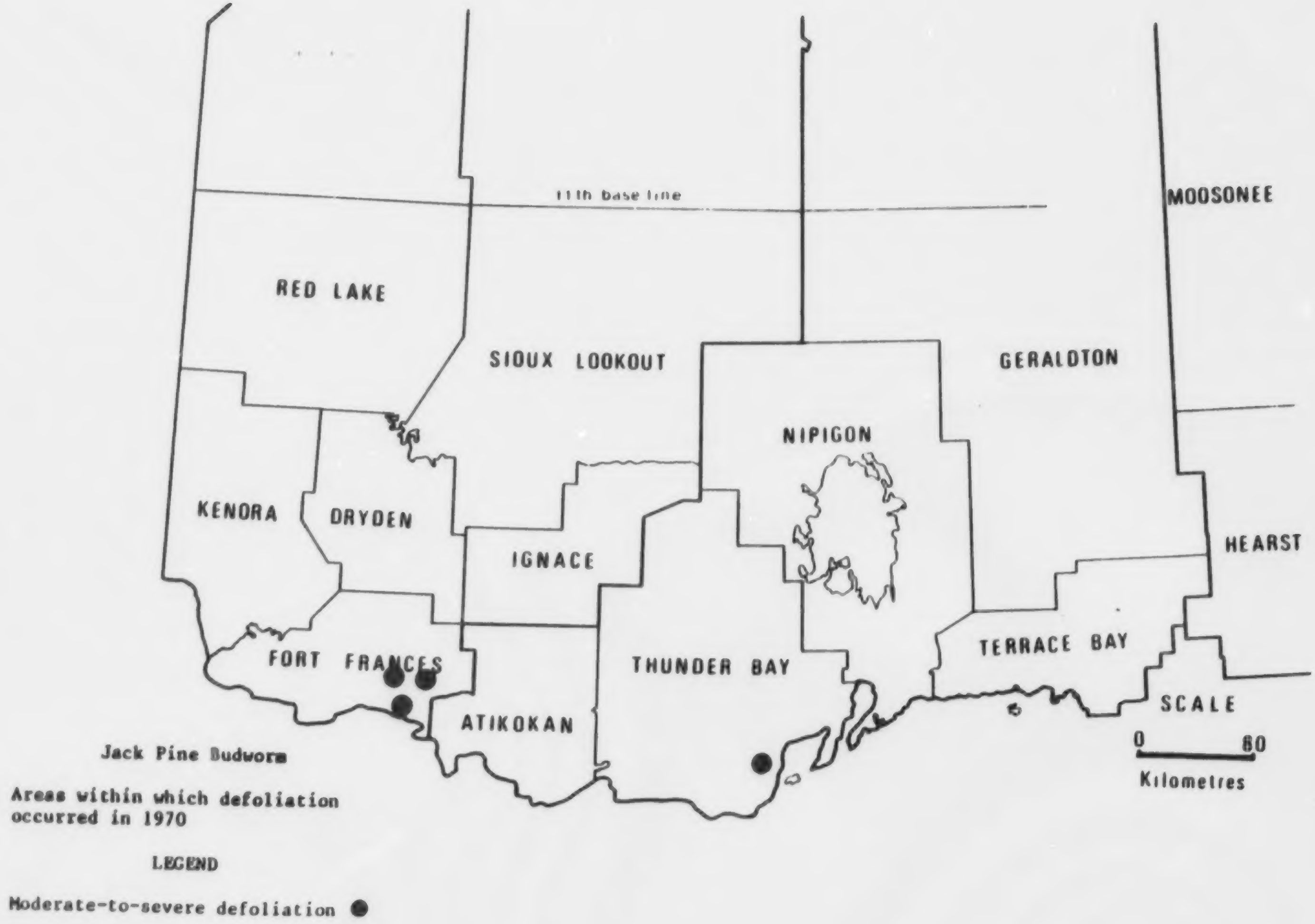
Jack Pine Budworm

Areas within which defoliation
occurred in 1969

LEGEND

Moderate-to-severe defoliation ●

NORTHWESTERN ONTARIO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FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

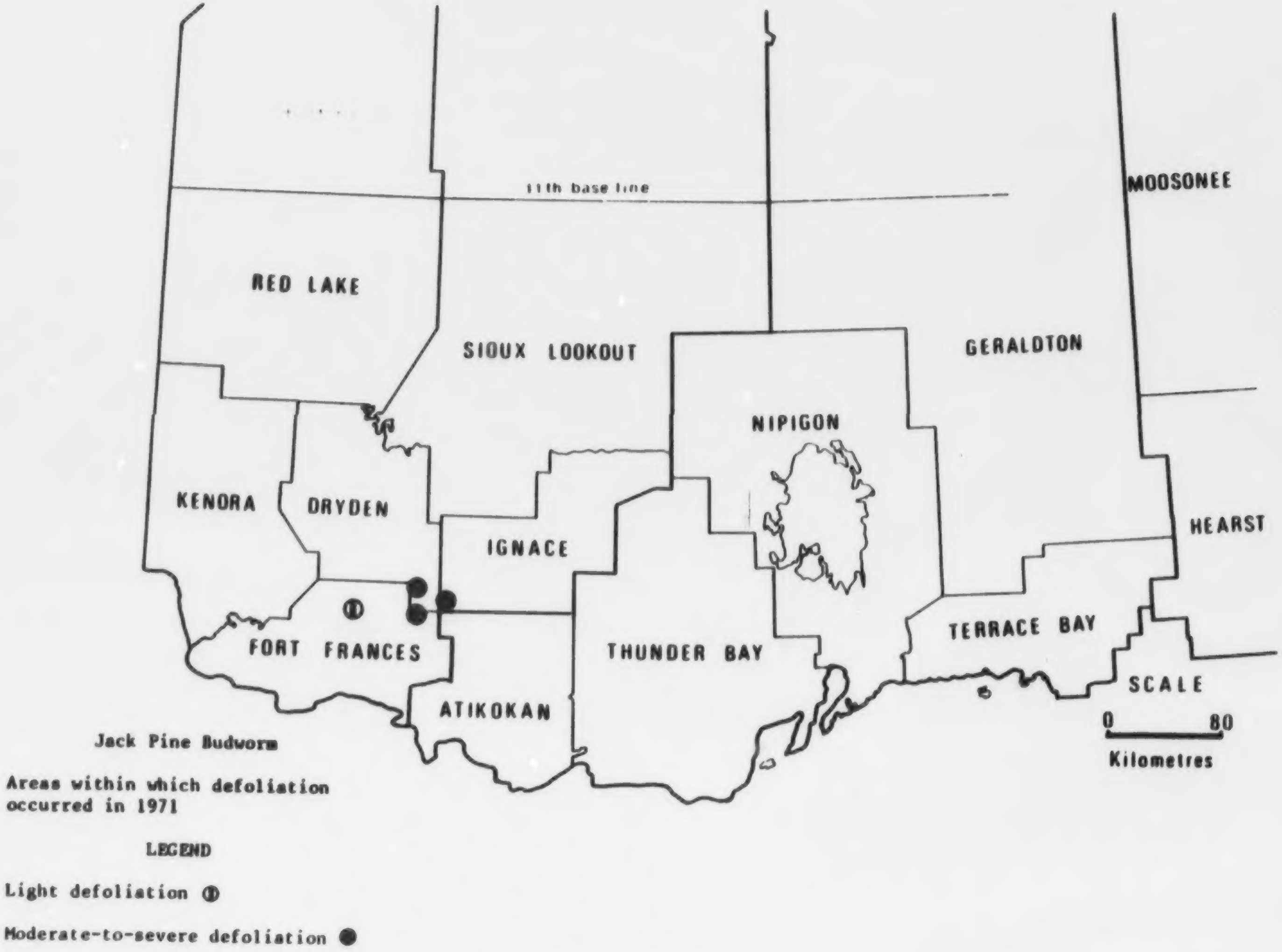
Jack Pine Budworm

Areas within which defoliation occurred in 1970

LEGEND

Moderate-to-severe defoliation ●

NORTHWESTERN ONTARIO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IGNACE
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FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

Jack Pine Budworm

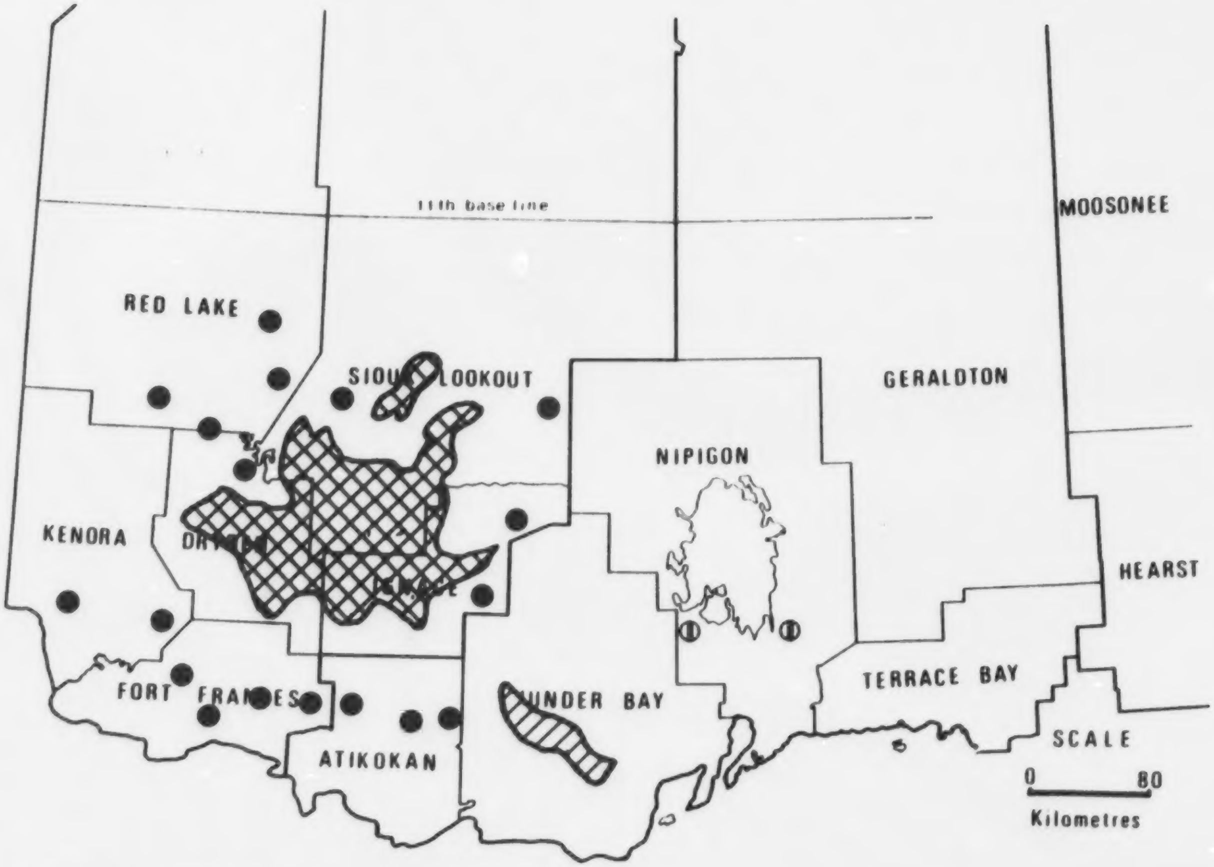
Areas within which defoliation occurred in 1971

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ●

NORTHWESTERN ONTARIO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SIOU LOOKOUT
GERALDTON
NIPIGON
KENORA
DR
HEARST
FORT FRA ES
UNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

Forest Tent Caterpillar

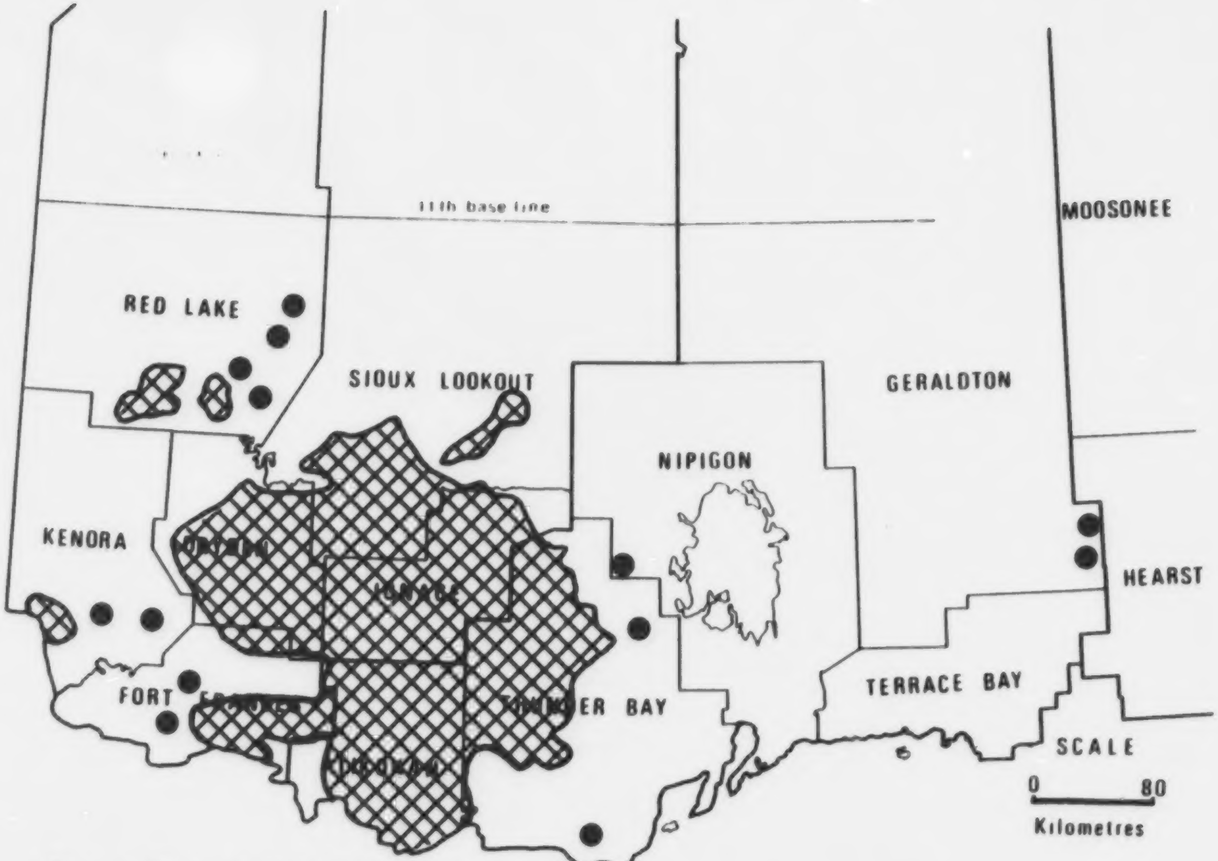
Areas within which defoliation occurred in 1950

LEGEND

Light defoliation ◍ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHWESTERN ONTARIO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KENORA
HEARST
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ER BAY
TERRACE BAY
SCALE
0
80
Kilometres

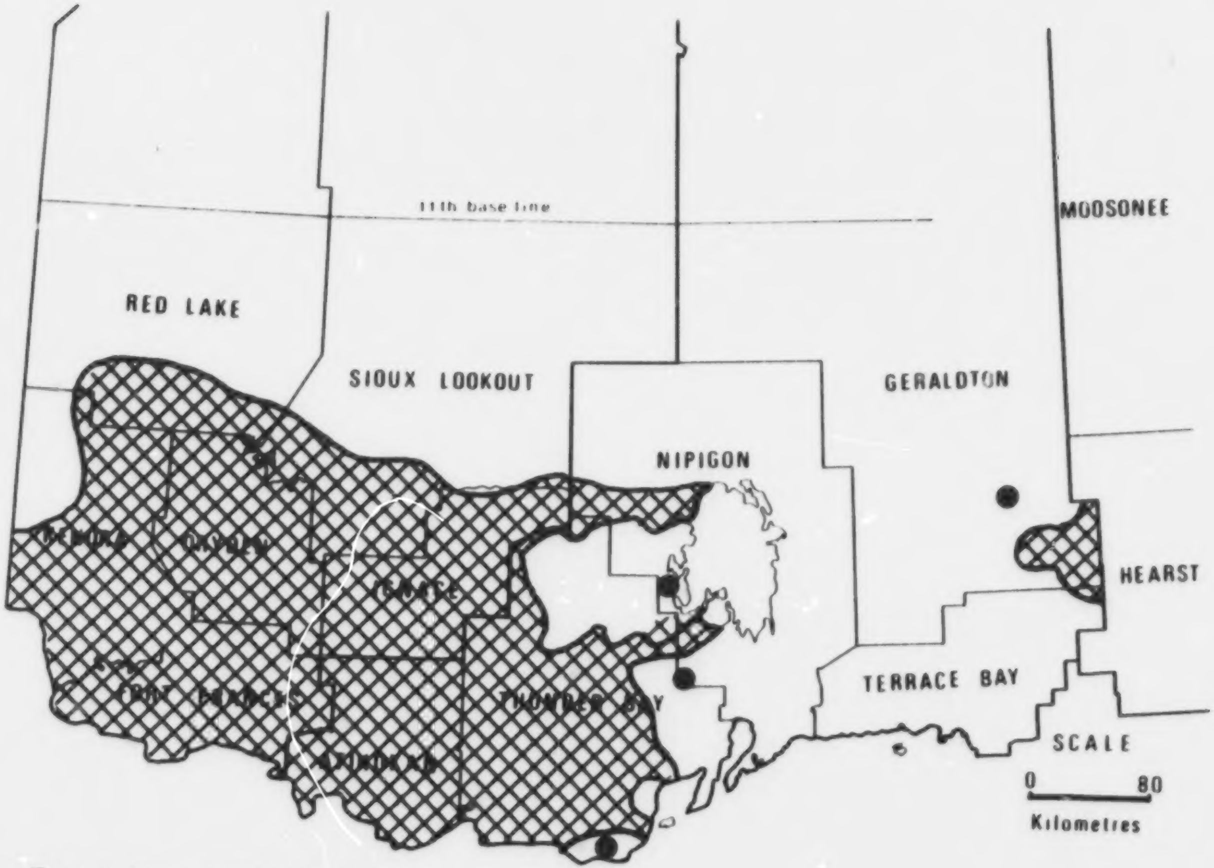
Forest Tent Caterpillar

Areas within which defoliation occurred in 1951

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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THUNDER BAY
SCALE
0
80
Kilometres

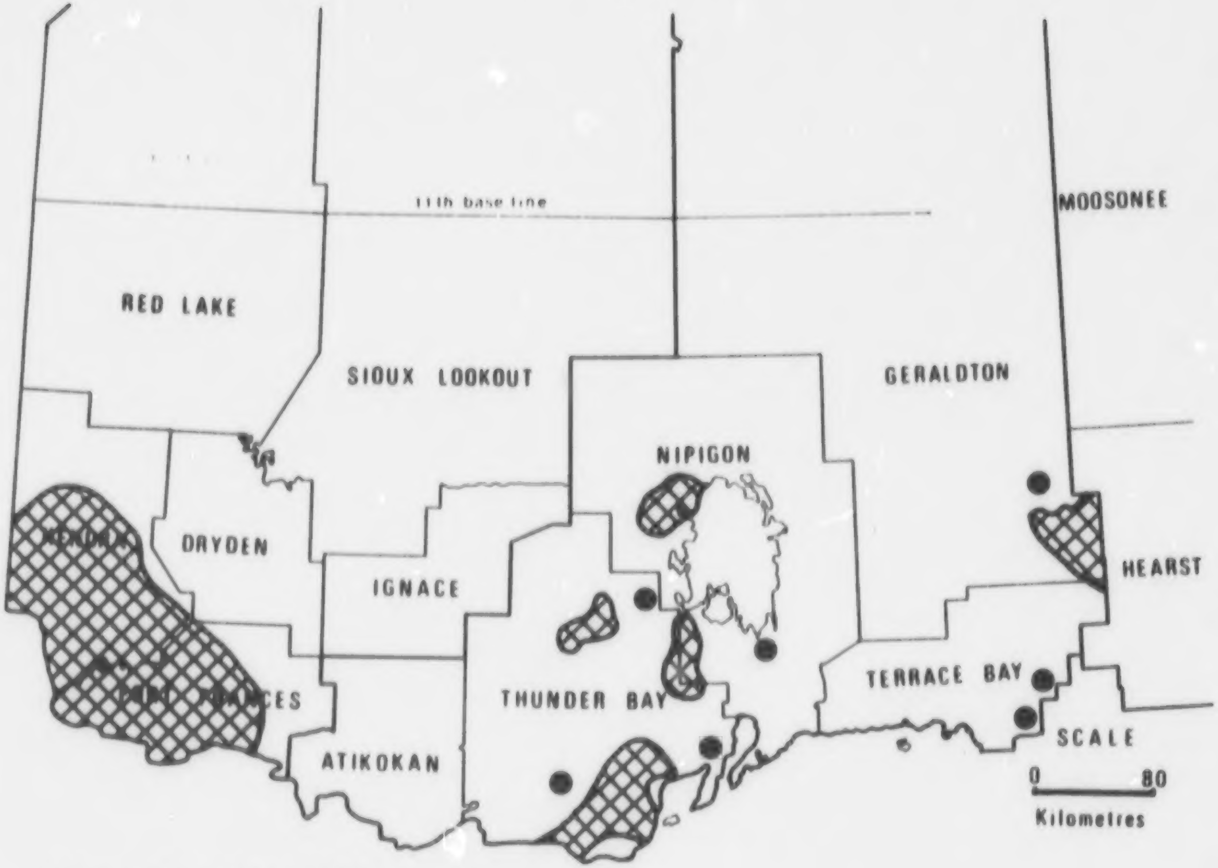
Forest Tent Caterpillar

Areas within which defoliation occurred in 1952

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO


11th base line
RED LAKE
SIOUX LOOKOUT
GERALDTON
MOOSONEE
NIPIGON
DRYDEN
IGNACE
HEARST
TERRACE BAY
THUNDER BAY
ATIKOKAN
SCALE
0
80
Kilometres

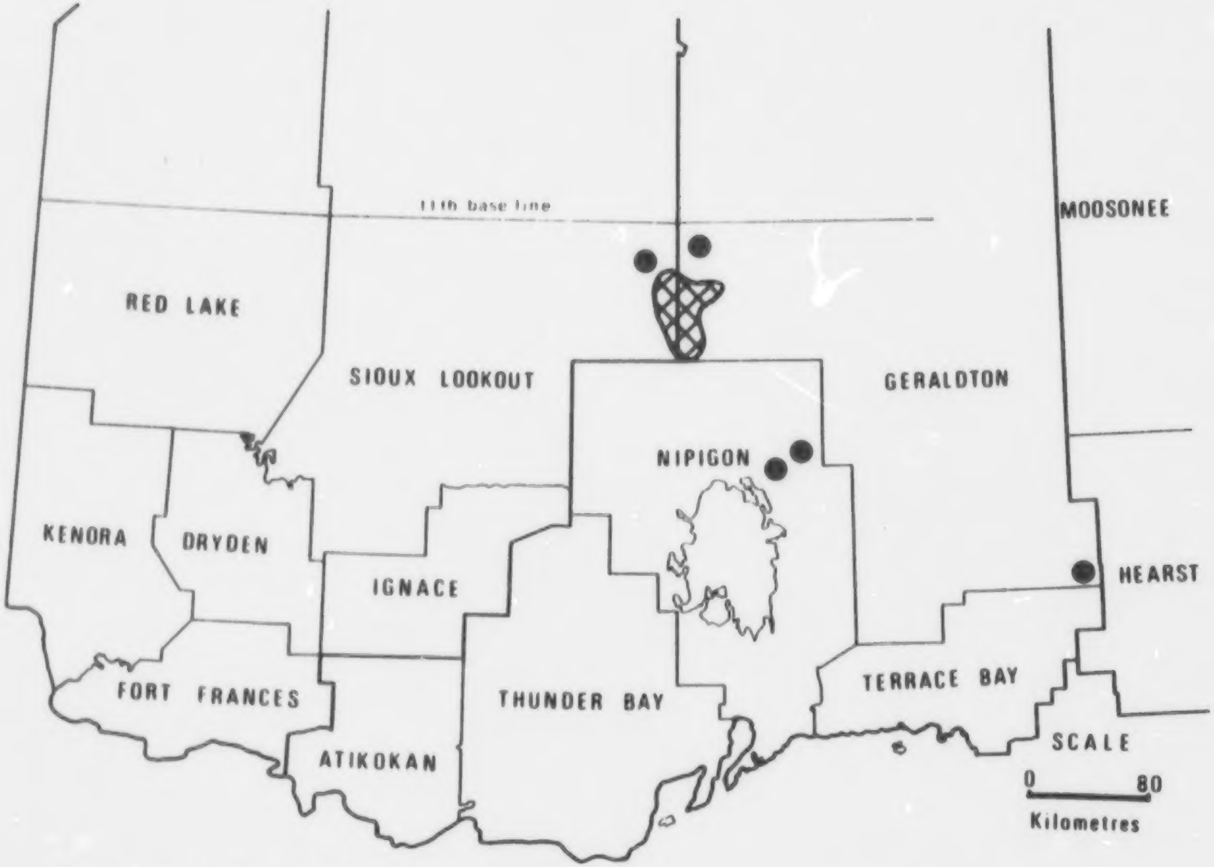
Forest Tent Caterpillar

Areas within which defoliation occurred in 1953

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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RED LAKE
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GERALDTON
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NIPIGON
KENORA
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IGNACE
HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

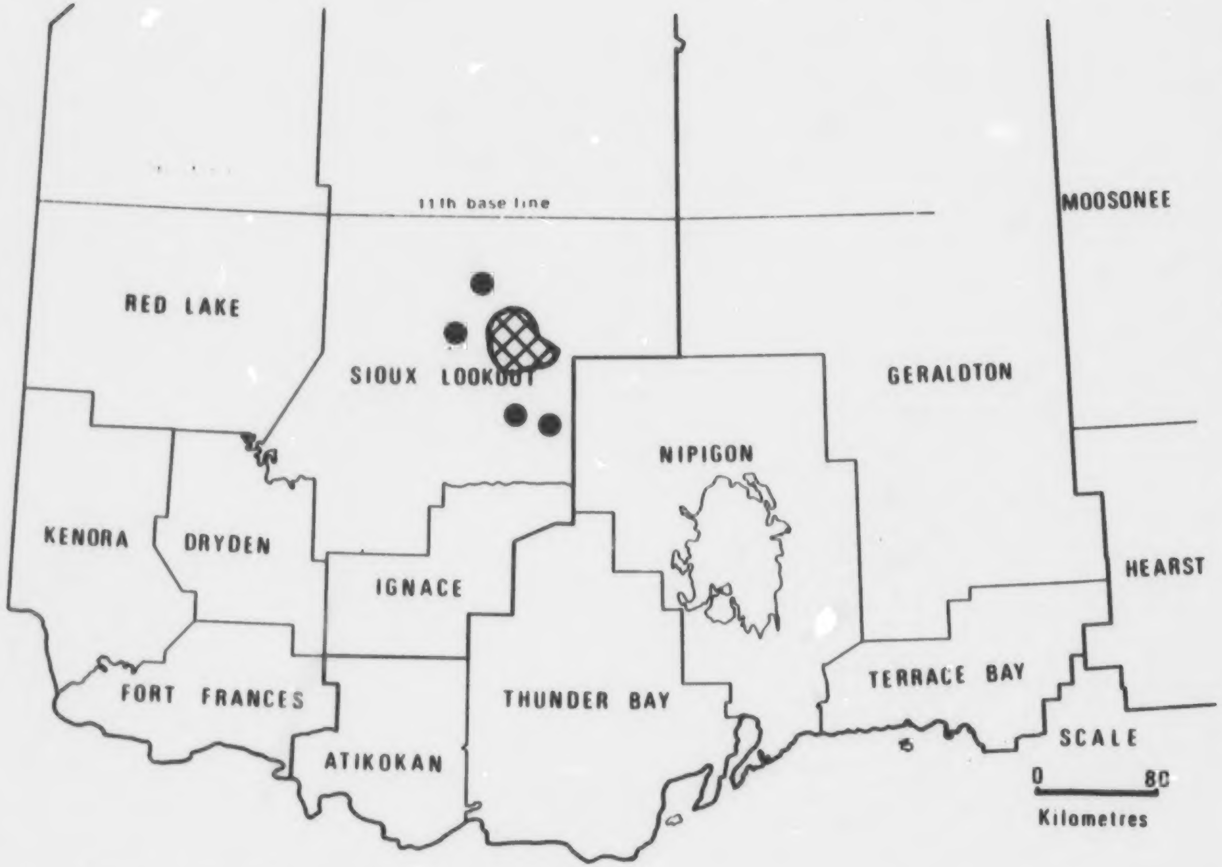
Forest Tent Caterpillar

Areas within which defoliation occurred in 1954

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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KENORA
DRYDEN
IGNACE
HEARST
TERRACE BAY
FORT FRANCES
THUNDER BAY
ATIKOKAN
SCALE
0
80
Kilometres

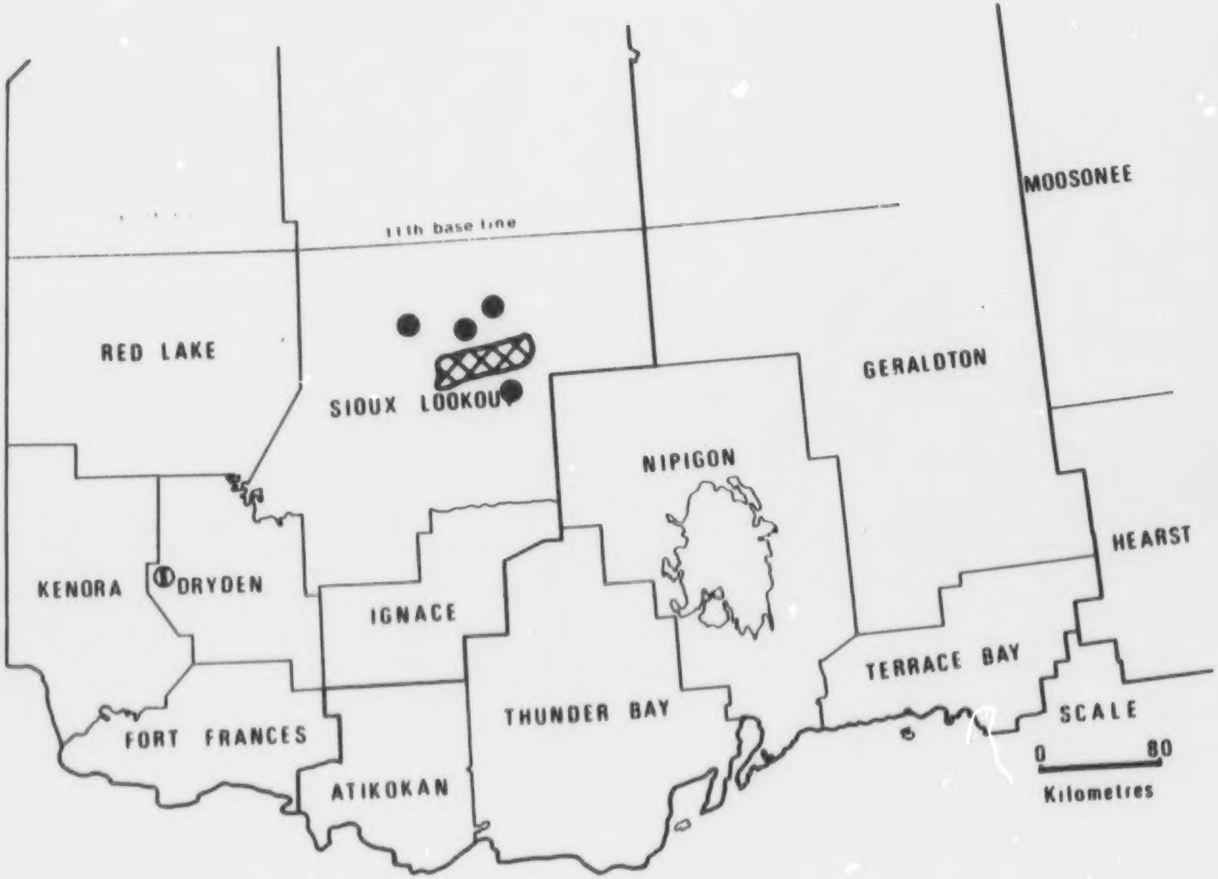
Forest Tent Caterpillar

Areas within which defoliation occurred in 1956

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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GERALDTON
NIPIGON
HEARST
KENORA
DRYDEN
IGNACE
TERRACE BAY
THUNDER BAY
FORT FRANCES
ATIKOKAN
SCALE
0
80
Kilometres

Forest Tent Caterpillar

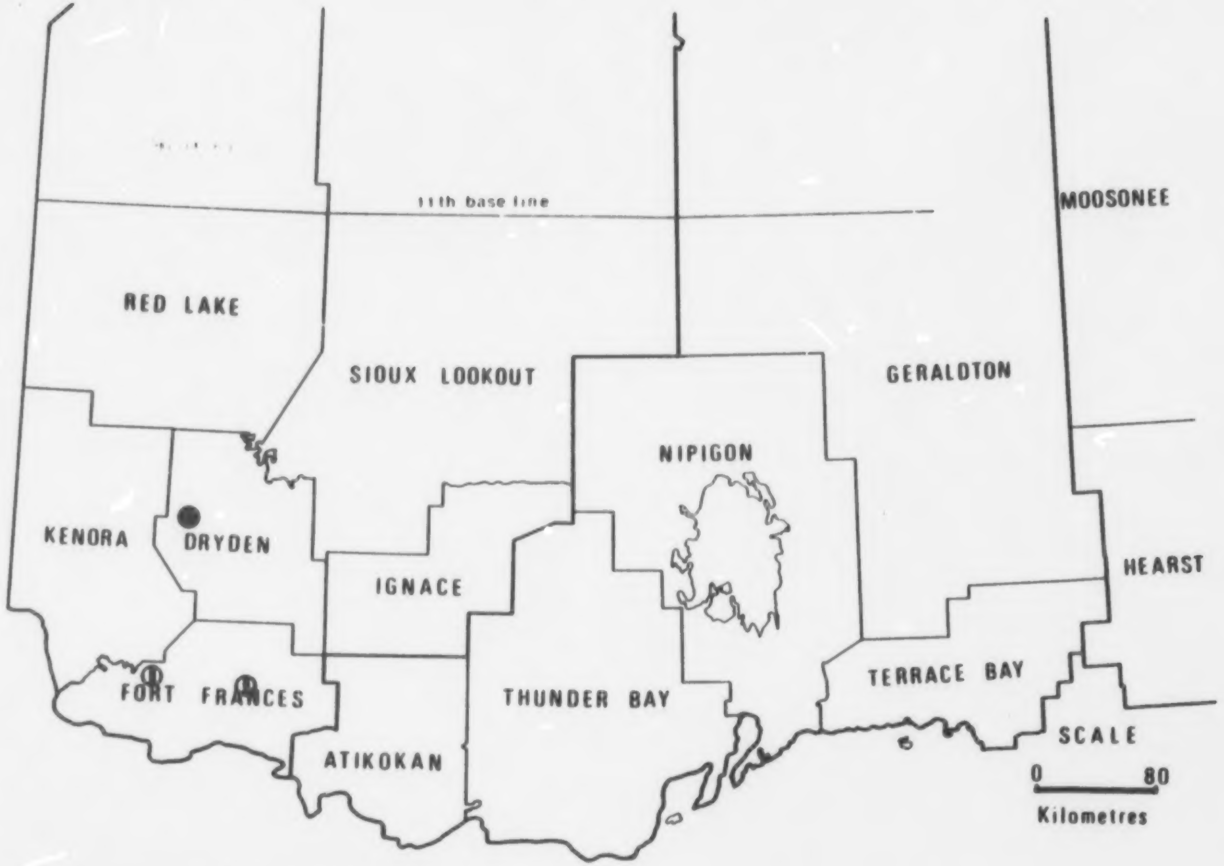
Areas within which defoliation occurred in 1957

LEGEND

Light defoliation ⦶

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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DRYDEN
IGNACE
HEARST
TERRACE BAY
FORT FRANCES
THUNDER BAY
ATIKOKAN
SCALE
0
80
Kilometres

Forest Tent Caterpillar

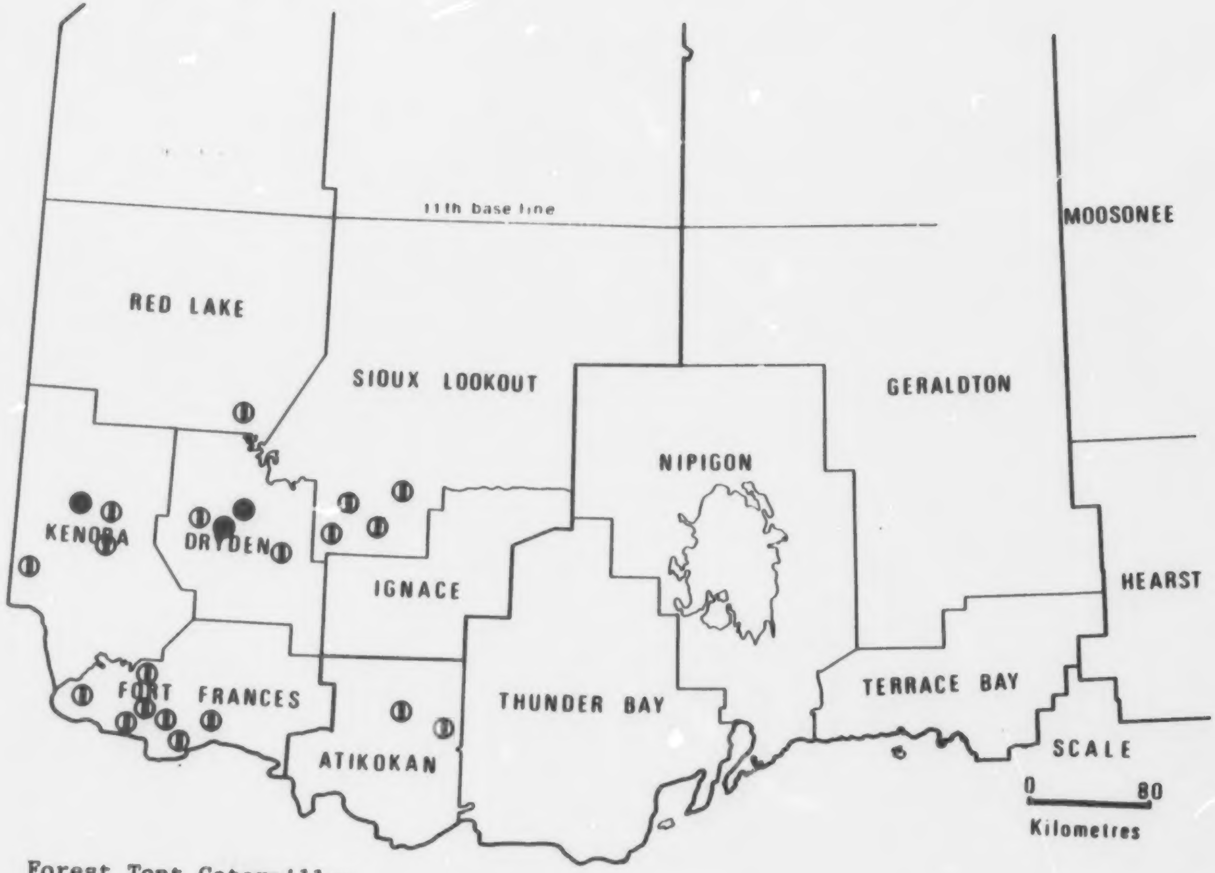
Areas within which defoliation occurred in 1959

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ●

NORTHWESTERN ONTARIO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IGNACE
HEARST
FORT FRANCES
TERRACE BAY
THUNDER BAY
ATIKOKAN
SCALE
0
80
Kilometres

Forest Tent Caterpillar

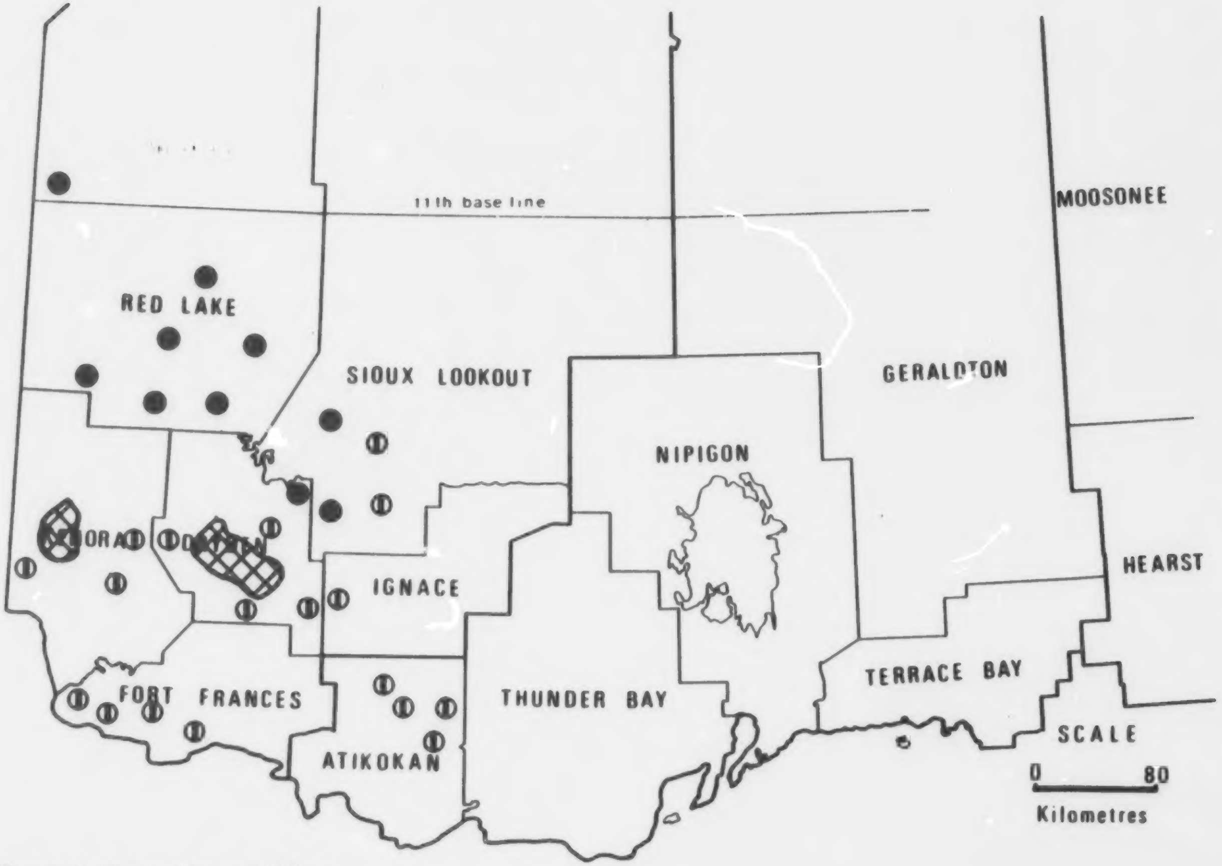
Areas within which defoliation occurred in 1960

LEGEND

Light defoliation Ⓘ

Moderate-to-severe defoliation ●

NORTHWESTERN ONTARIO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GERALDTON
NIPIGON
HEARST
IGNACE
THUNDER BAY
TERRACE BAY
FORT FRANCES
ATIKOKAN
SCALE
0
80
Kilometres

Forest Tent Caterpillar

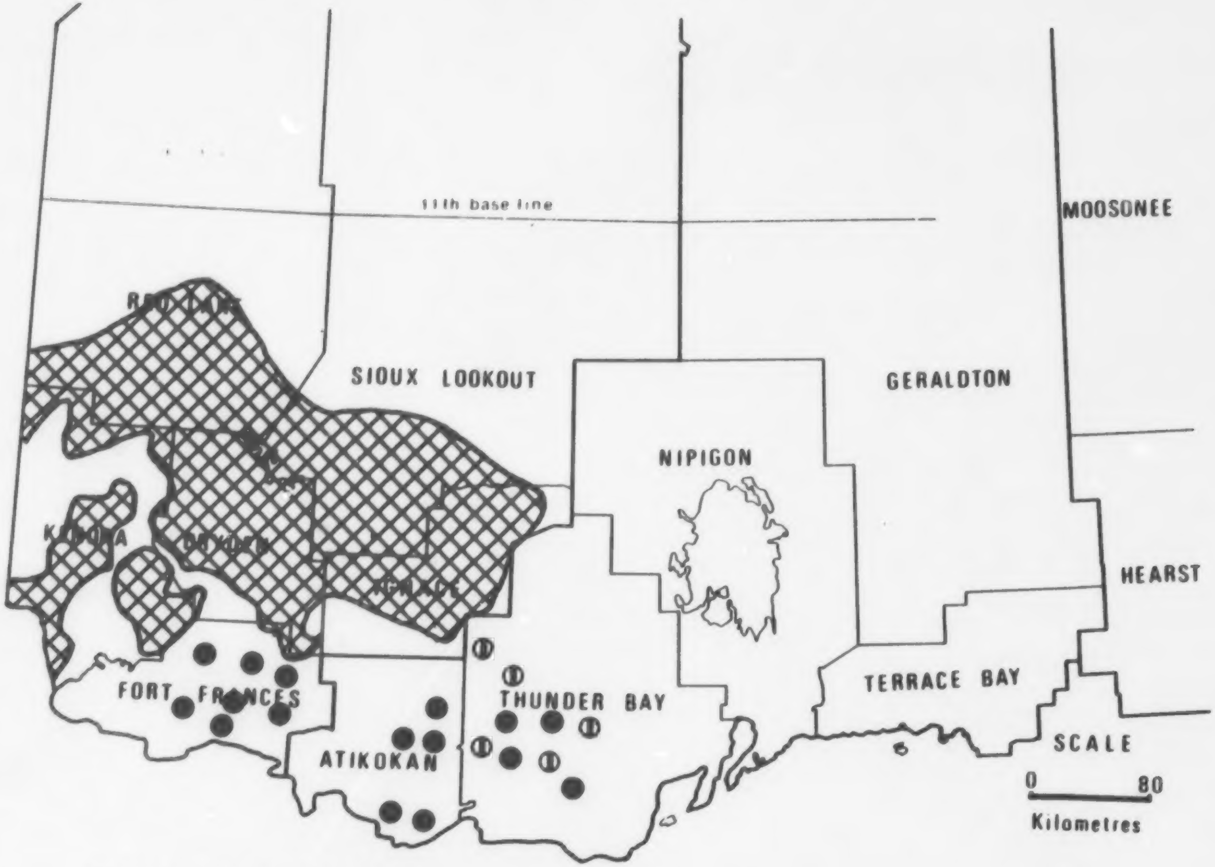
Areas within which defoliation occurred in 1961

LEGEND

Light defoliation ⓛ

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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KENORA
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IGNACE
HEARST
FORT FRANCES
ATIKOKAN
THUNDER BAY
TERRACE BAY
SCALE
0
80
Kilometres

Forest Tent Caterpillar

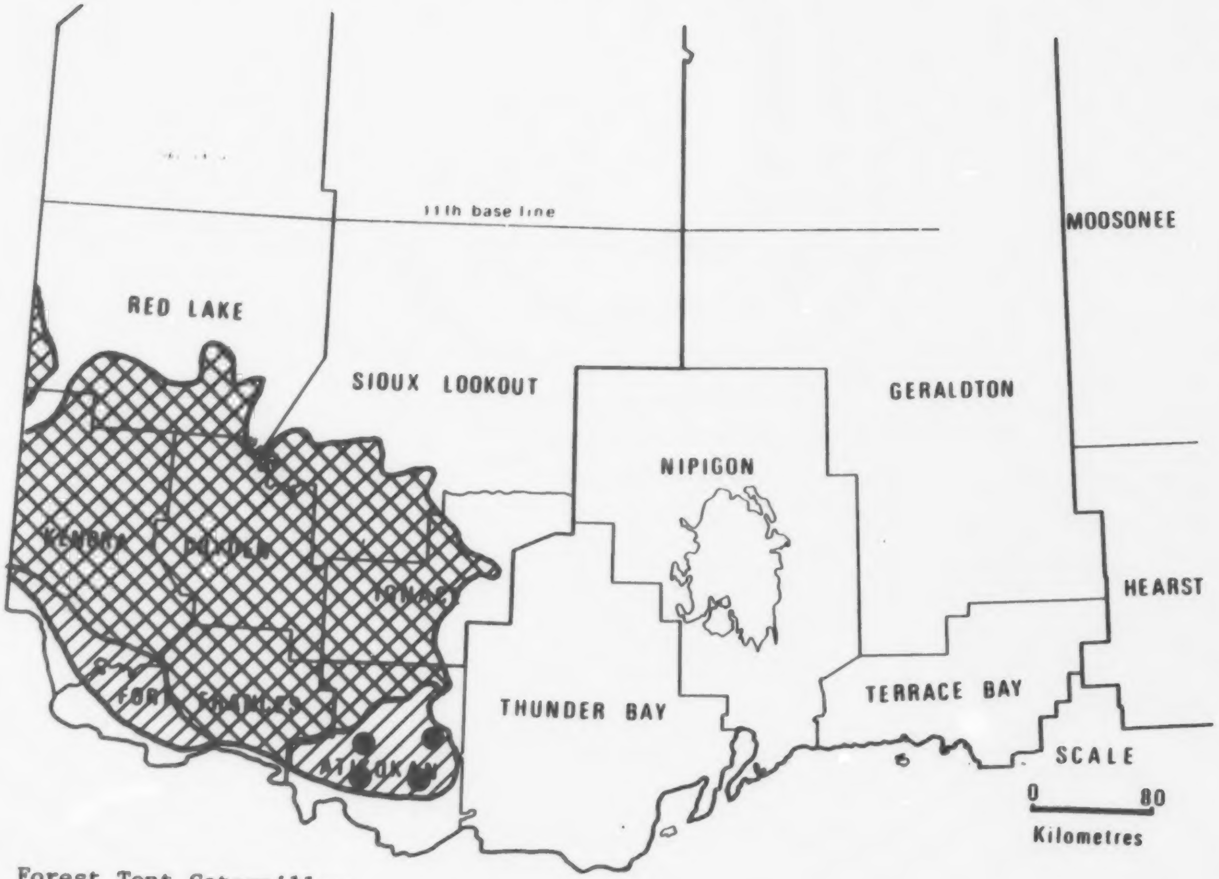
Areas within which defoliation occurred in 1962

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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HEARST
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THUNDER BAY
KENORA
DRYDEN
IGNACE
FORT FRANCES
ATIKOKAN
SCALE
0
80
Kilometres

Forest Tent Caterpillar

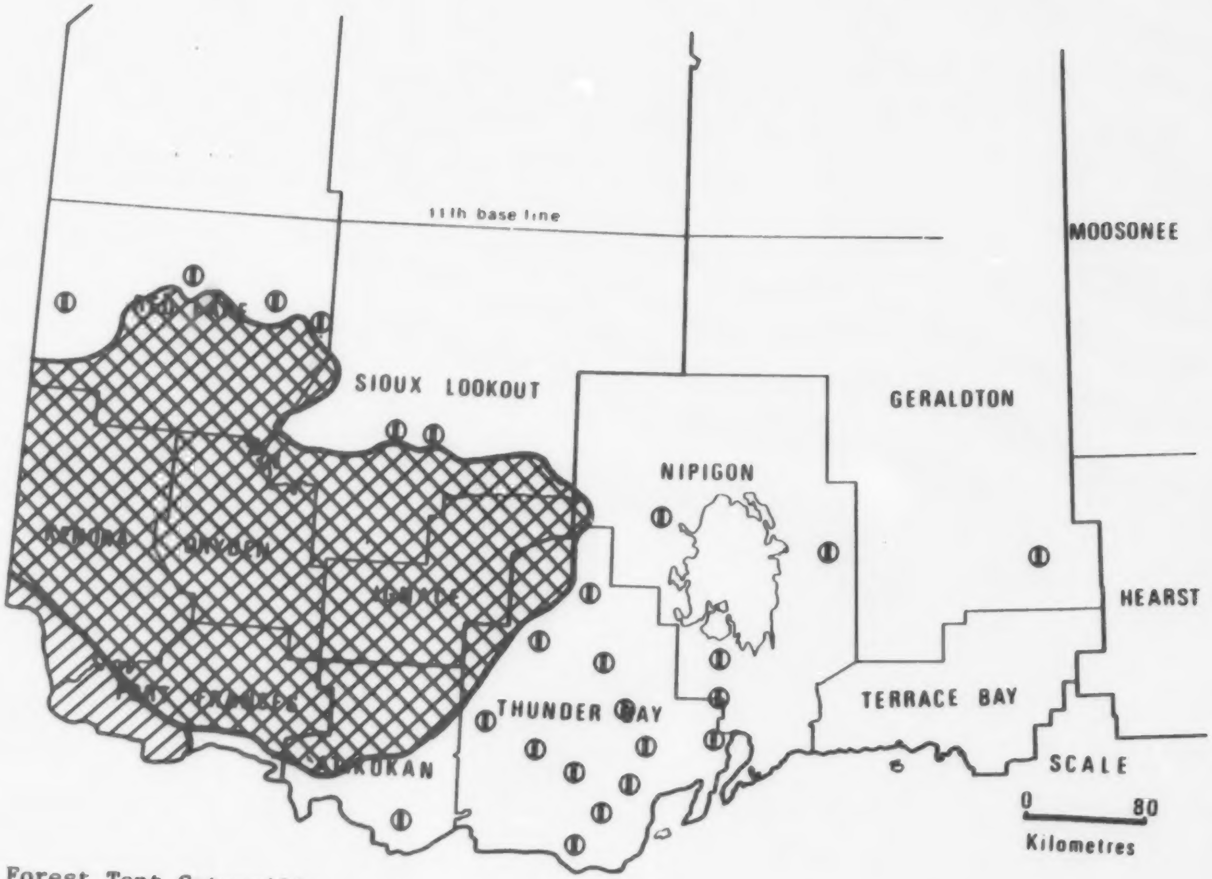
Areas within which defoliation occurred in 1963

LEGEND

Light defoliation ▨

Moderate-to-severe defoliation ● or ▩

NORTHWESTERN ONTARIO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SIOUX LOOKOUT
GERALDTON
NIPIGON
HEARST
TERRACE BAY
THUNDER BAY
SCALE
0
80
Kilometres

Forest Tent Caterpillar

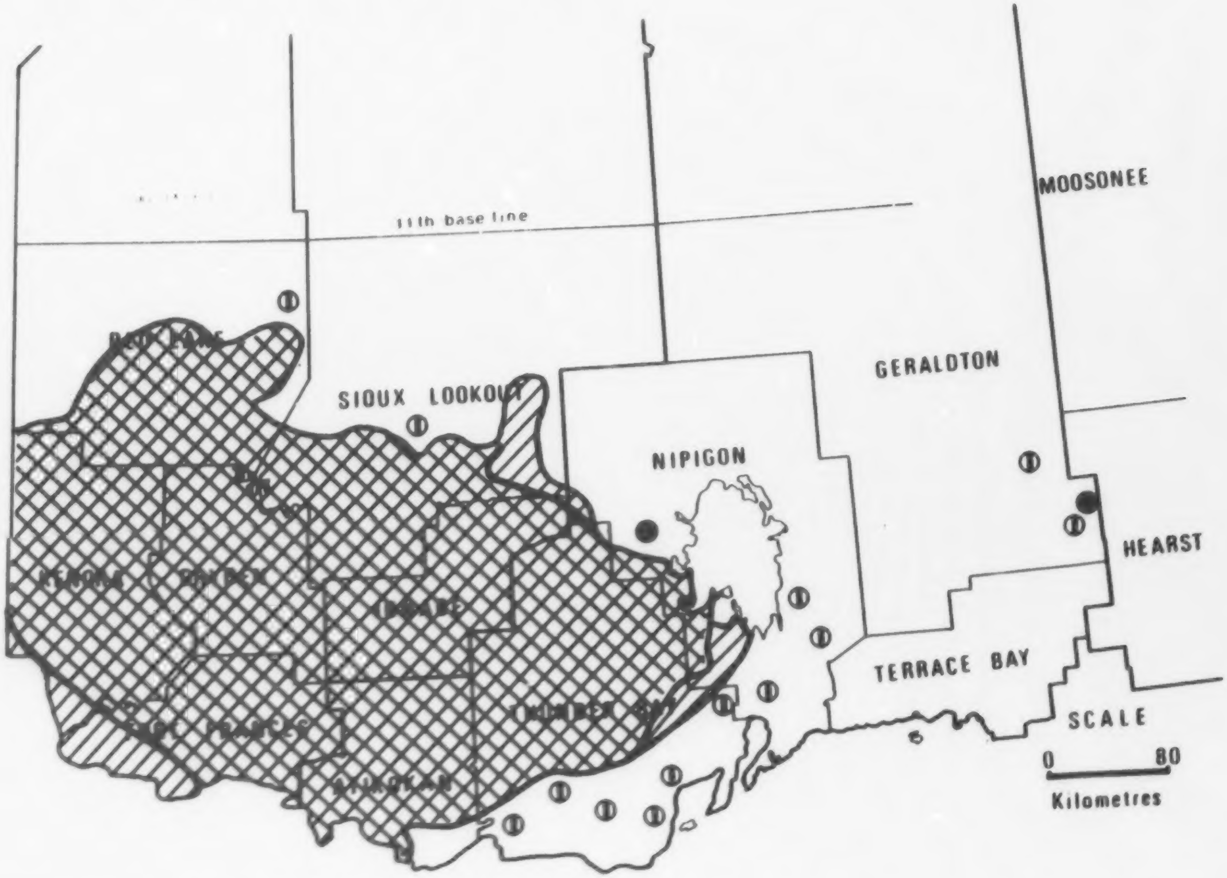
Areas within which defoliation occurred in 1964

LEGEND

Light defoliation ⦶ or ▨

Moderate-to-severe defoliation ▩

NORTHWESTERN ONTARIO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11th base line
SIOUX LOOKOUT
NIPIGON
GERALDTON
HEARST
TERRACE BAY
SCALE
0
80
Kilometres

Forest Tent Caterpillar

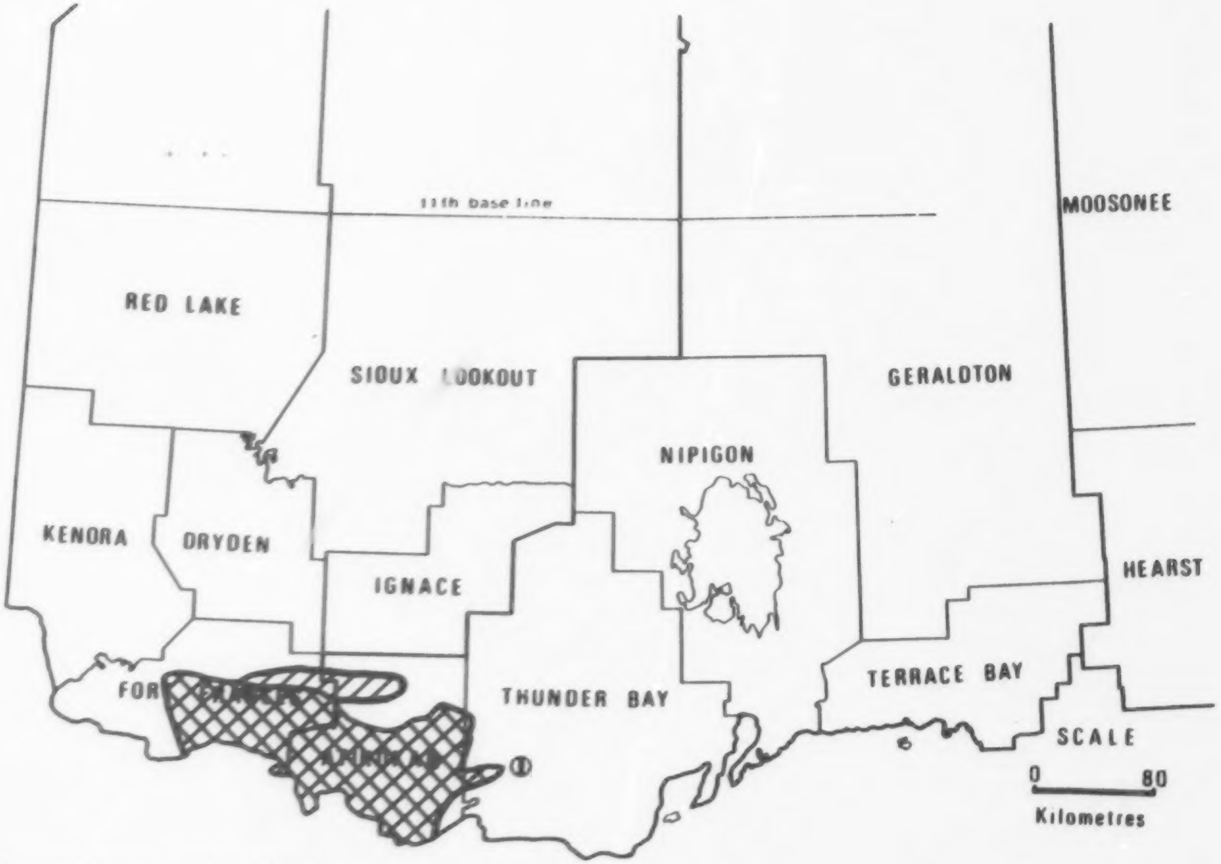
Areas within which defoliation occurred in 1965

LEGEND

Light defoliation ⦶ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHWESTERN ONTARIO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MOOSONEE
RED LAKE
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GERALDTON
NIPIGON
KENORA
DRYDEN
IGNACE
HEARST
FOR
THUNDER BAY
TERRACE BAY
SCALE
0
80
Kilometres

Forest Tent Caterpillar

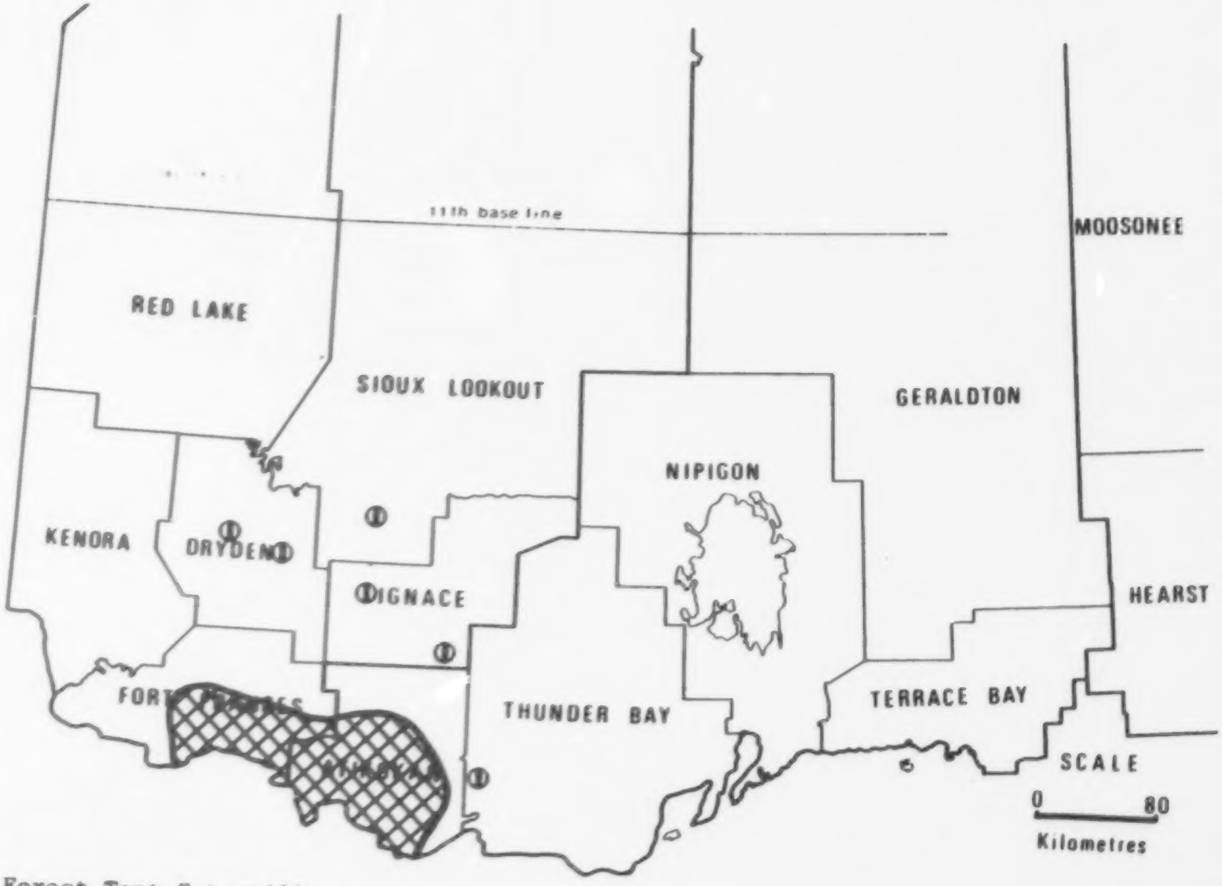
Areas within which defoliation occurred in 1966

LEGEND

Light defoliation ① or ▨

Moderate-to-severe defoliation ▦

NORTHWESTERN ONTARIO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NIPIGON
KENORA
DRYDEN
IGNACE
HEARST
FORT
THUNDER BAY
TERRACE BAY
SCALE
0
80
Kilometres

Forest Tent Caterpillar

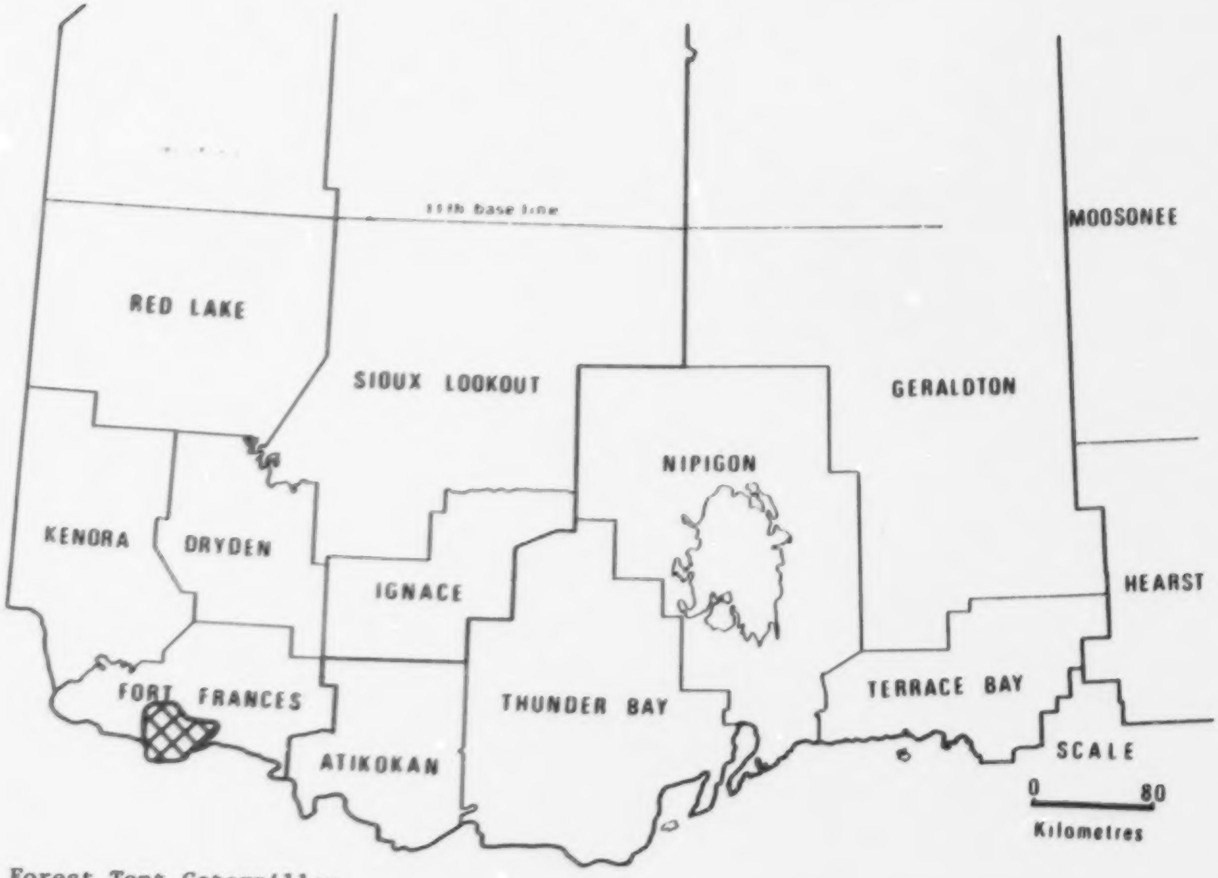
Areas within which defoliation occurred in 1967

LEGEND

Light defoliation ⦶

Moderate-to-severe defoliation ▨

NORTHWESTERN ONTARIO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IGNACE
HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

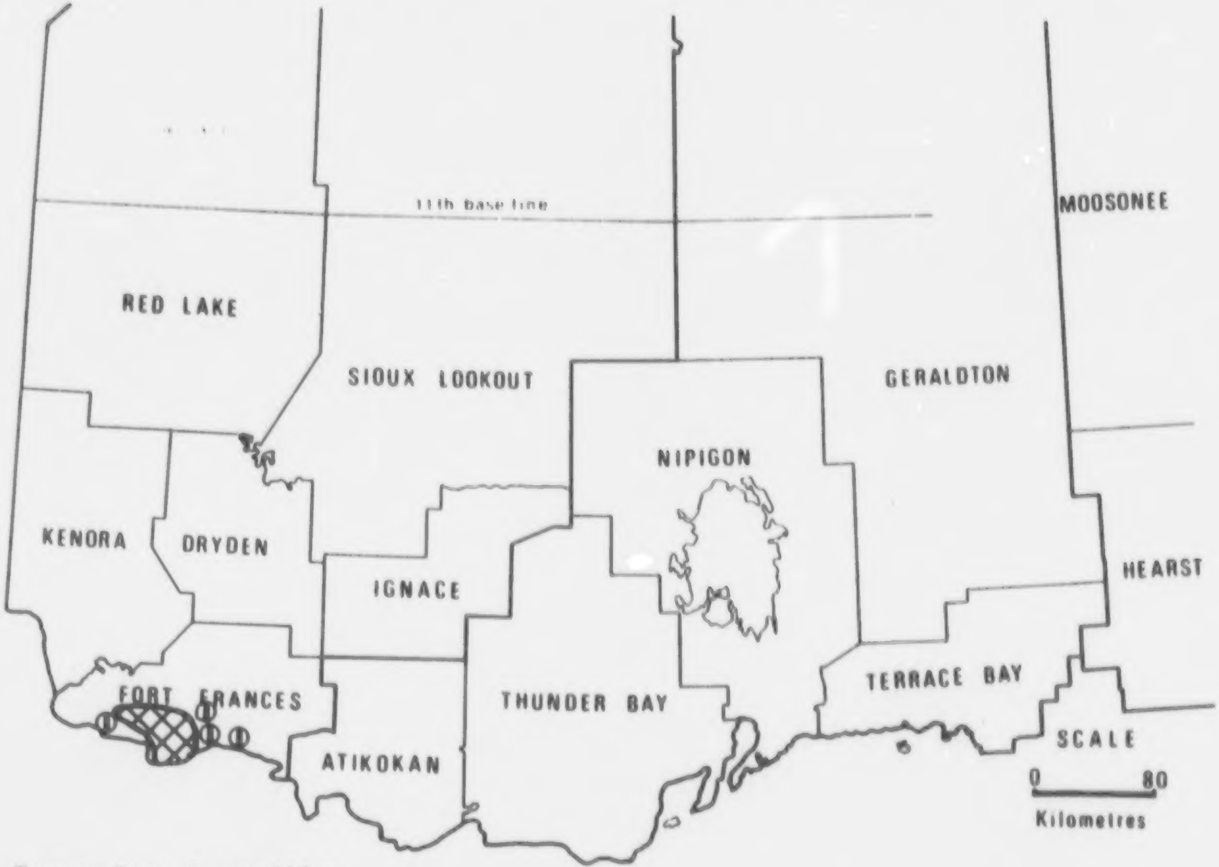
Forest Tent Caterpillar

Areas within which defoliation occurred in 1968

LEGEND

Moderate-to-severe defoliation ▨

NORTHWESTERN ONTARIO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KENORA
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IGNACE
HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

Forest Tent Caterpillar

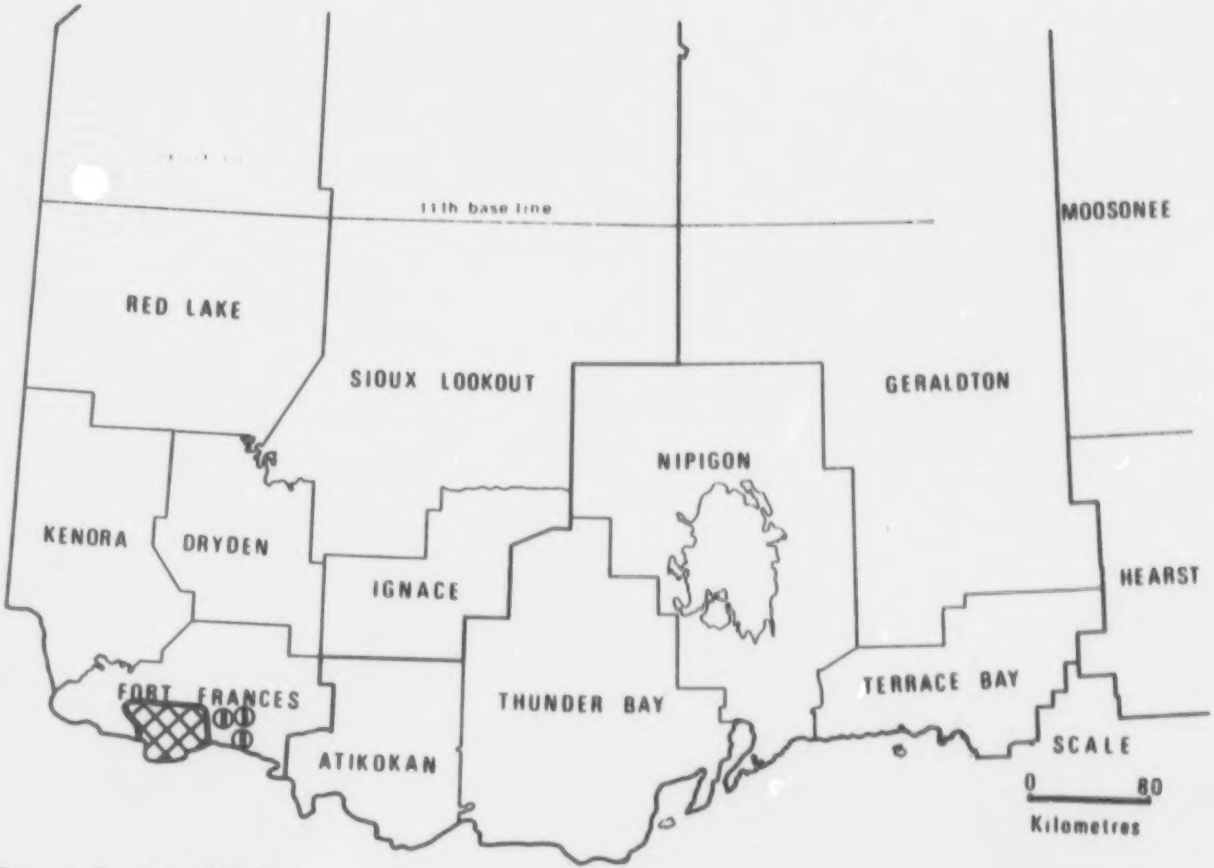
Areas within which defoliation occurred in 1969

LEGEND

Light defoliation ①

Moderate-to-severe defoliation ▨

NORTHWESTERN ONTARIO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NIPIGON
KENORA
DRYDEN
IGNACE
HEARST
FORT FRANCES
ATIKOKAN
THUNDER BAY
TERRACE BAY
SCALE
0
80
Kilometres

Forest Tent Caterpillar

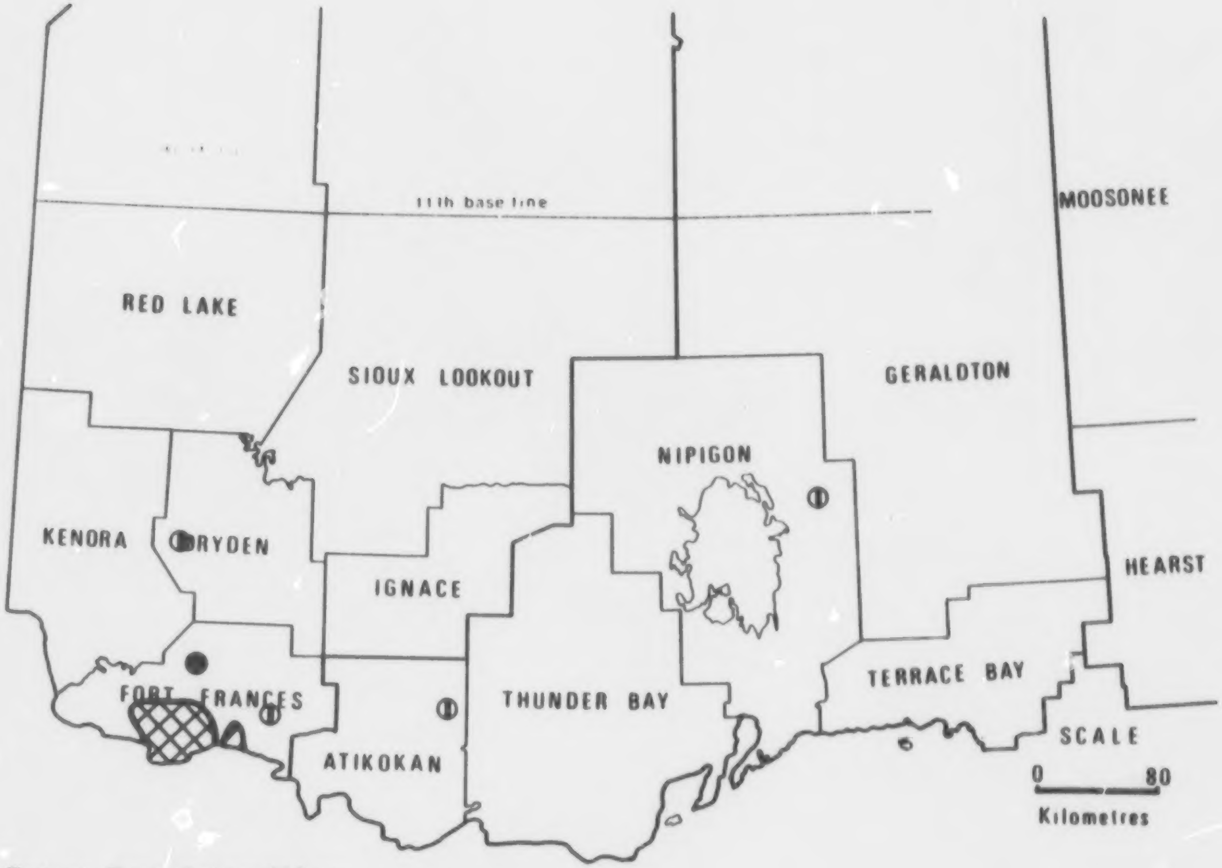
Areas within which defoliation occurred in 1970

LEGEND

Light defoliation ①

Moderate-to-severe defoliation ▨

NORTHWESTERN ONTARIO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NIPIGON
KENORA
DRYDEN
IGNACE
HEARST
FORT FRANCES
TERRACE BAY
THUNDER BAY
ATIKOKAN
SCALE
0
80
Kilometres

Forest Tent Caterpillar

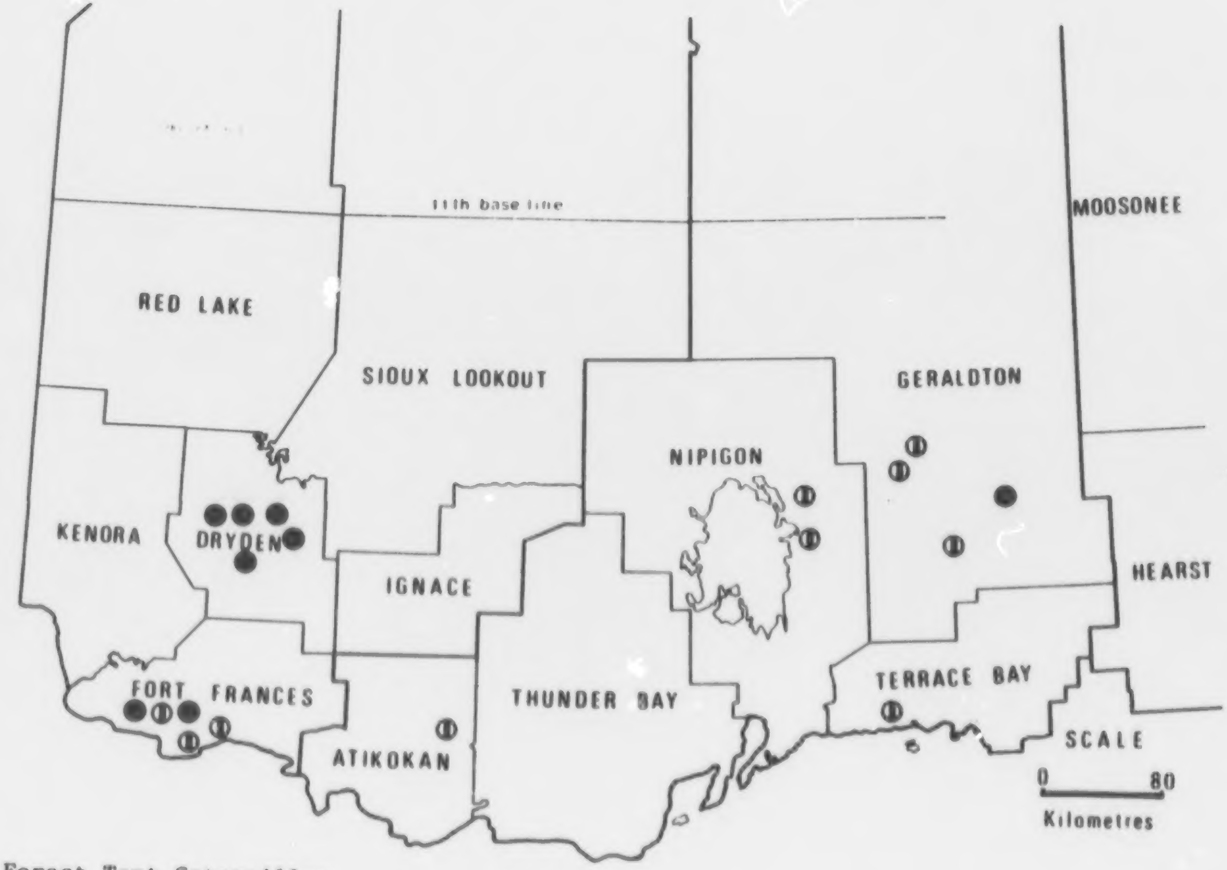
Areas within which defoliation occurred in 1971

LEGEND

Light defoliation ⦶ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHWESTERN ONTARIO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KENORA
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IGNACE
HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

Forest Tent Caterpillar

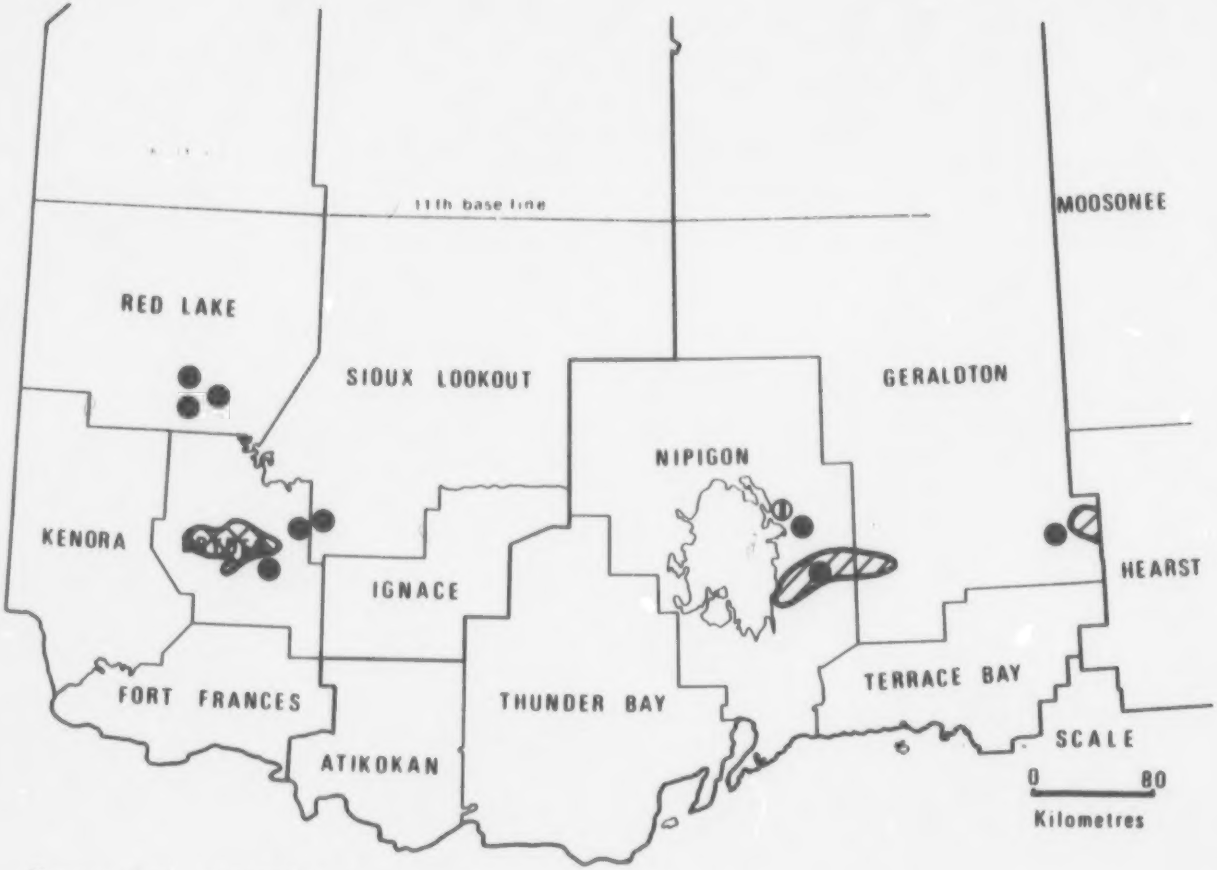
Areas within which defoliation occurred in 1972

LEGEND

Light defoliation ⦶

Moderate-to-severe defoliation ●

NORTHWESTERN ONTARIO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MOOSONEE
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GERALDTON
NIPIGON
KENORA
IGNACE
HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

Forest Tent Caterpillar

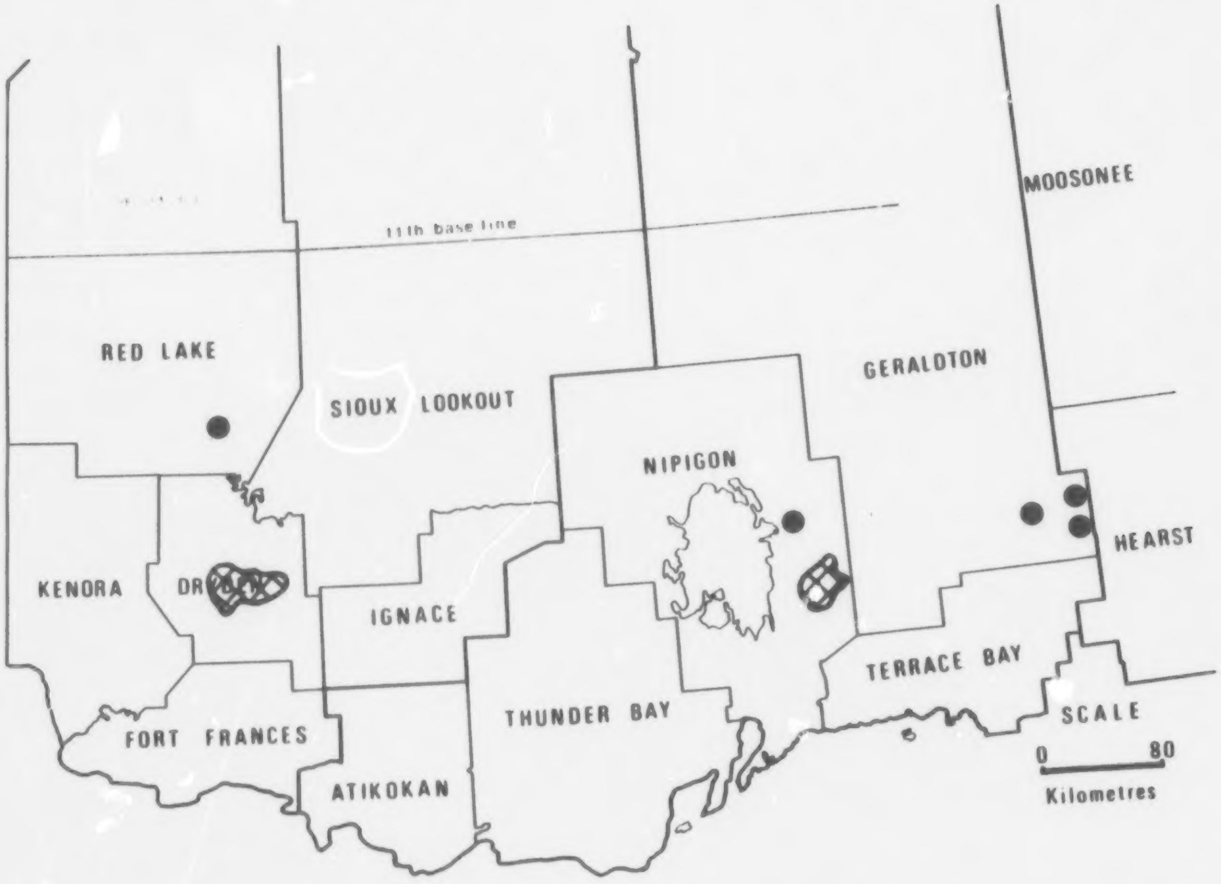
Areas within which defoliation occurred in 1973

LEGEND

Light defoliation ◑ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHWESTERN ONTARIO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RED LAKE
SIOUX LOOKOUT
GERALDTON
NIPIGON
HEARST
KENORA
DR
IGNACE
TERRACE BAY
THUNDER BAY
SCALE
0
80
Kilometres
FORT FRANCES
ATIKOKAN

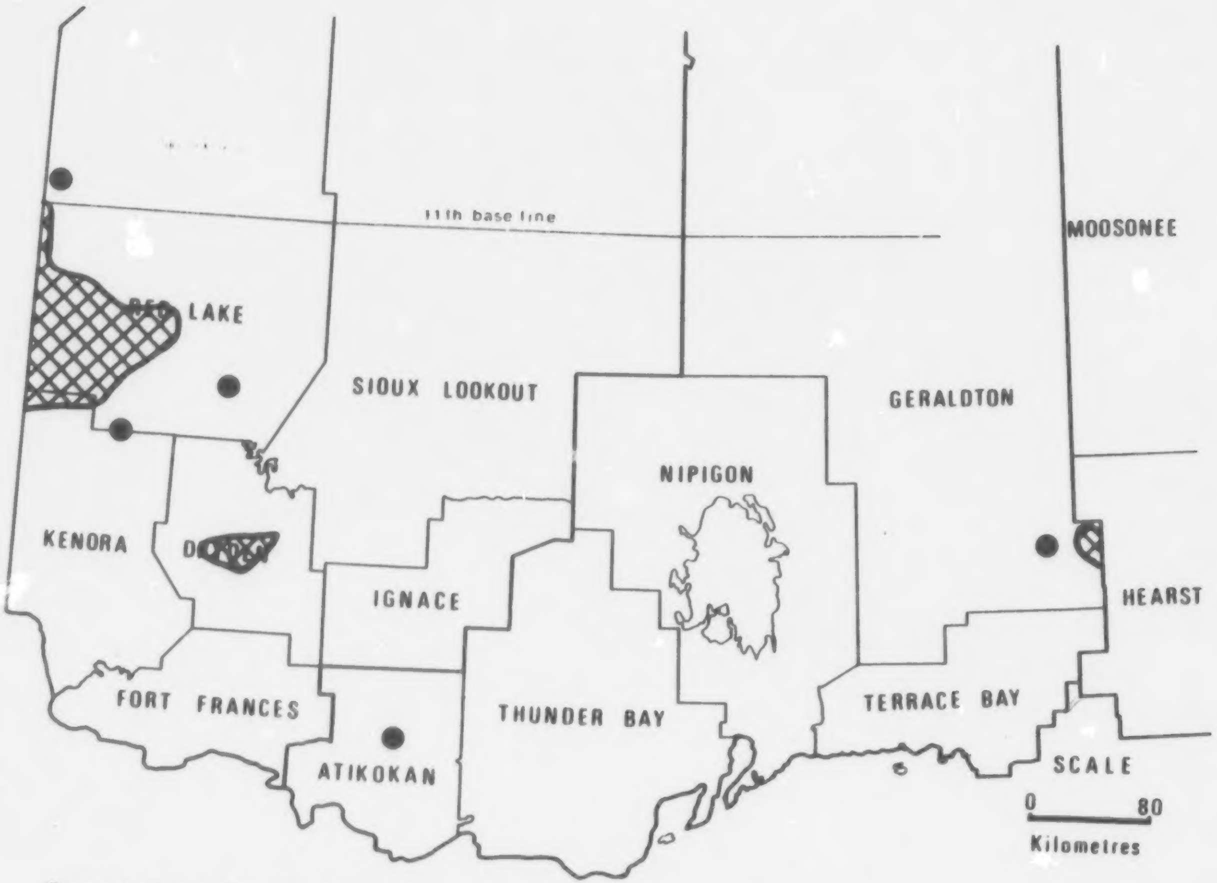
Forest Tent Caterpillar

Areas within which defoliation occurred in 1974

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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MOOSONEE
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GERALDTON
NIPIGON
KENORA
D
IGNACE
HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

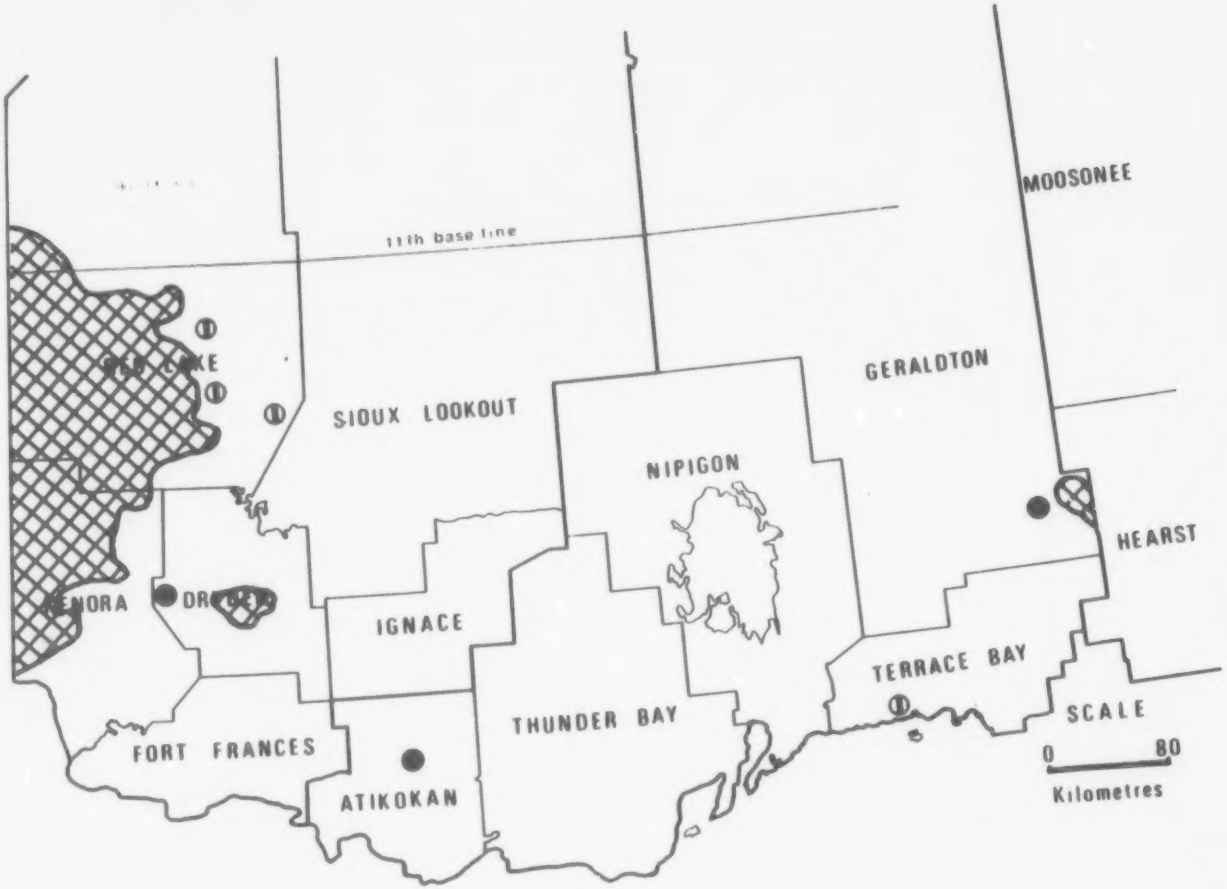
Forest Tent Caterpillar

Areas within which defoliation occurred in 1975

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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HEARST
KENORA
DRYDEN
IGNACE
TERRACE BAY
THUNDER BAY
SCALE
0
80
Kilometres
FORT FRANCES
ATIKOKAN

Forest Tent Caterpillar

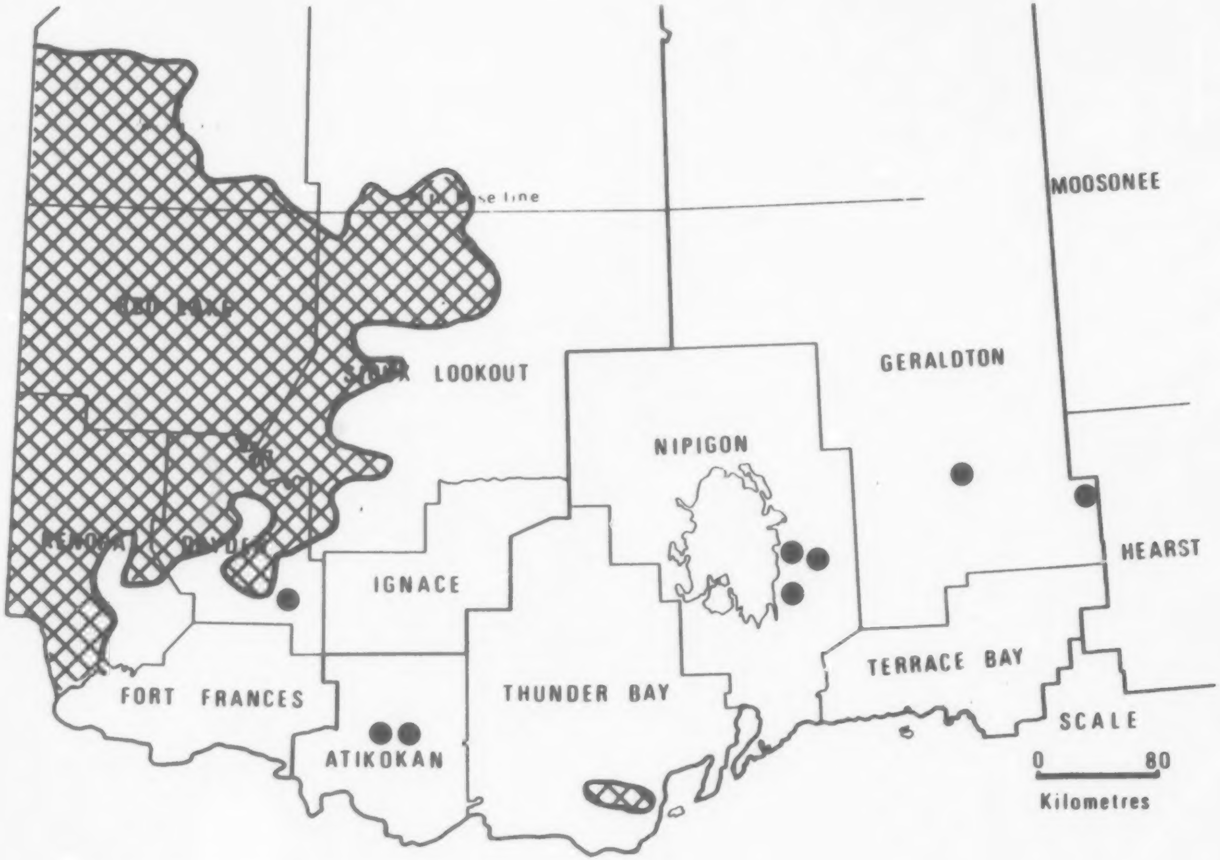
Areas within which defoliation occurred in 1976

LEGEND

Light defoliation ⦶

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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LOOKOUT
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HEARST
IGNACE
TERRACE BAY
FORT FRANCES
THUNDER BAY
ATIKOKAN
SCALE
0
80
Kilometres

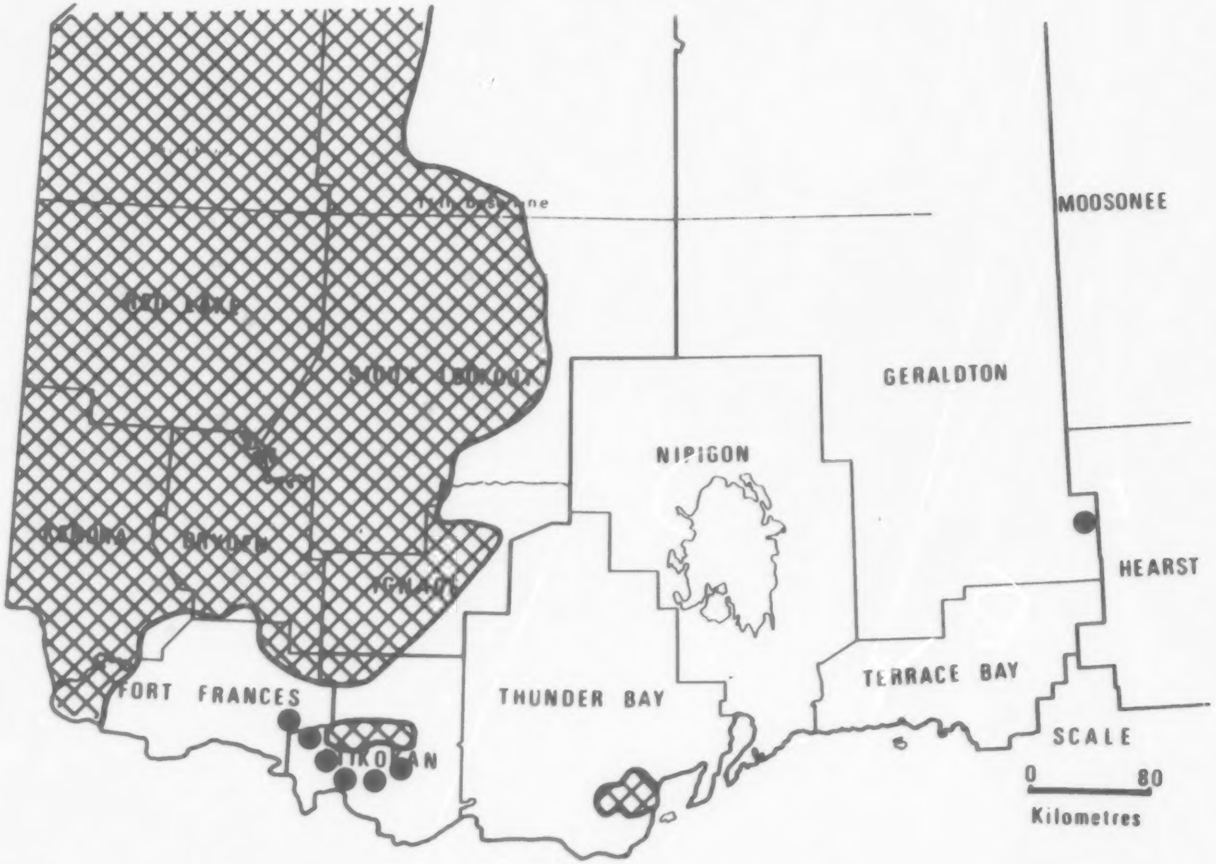
Forest Tent Caterpillar

Areas within which defoliation occurred in 1977

LEGEND

Moderate-to-severe defoliation ● or ▨.

NORTHWESTERN ONTARIO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SIOUX LOOKOUT
NIPIGON
HEARST
FORT FRANCES
ATIKOKAN
THUNDER BAY
TERRACE BAY
SCALE
0
80
Kilometres

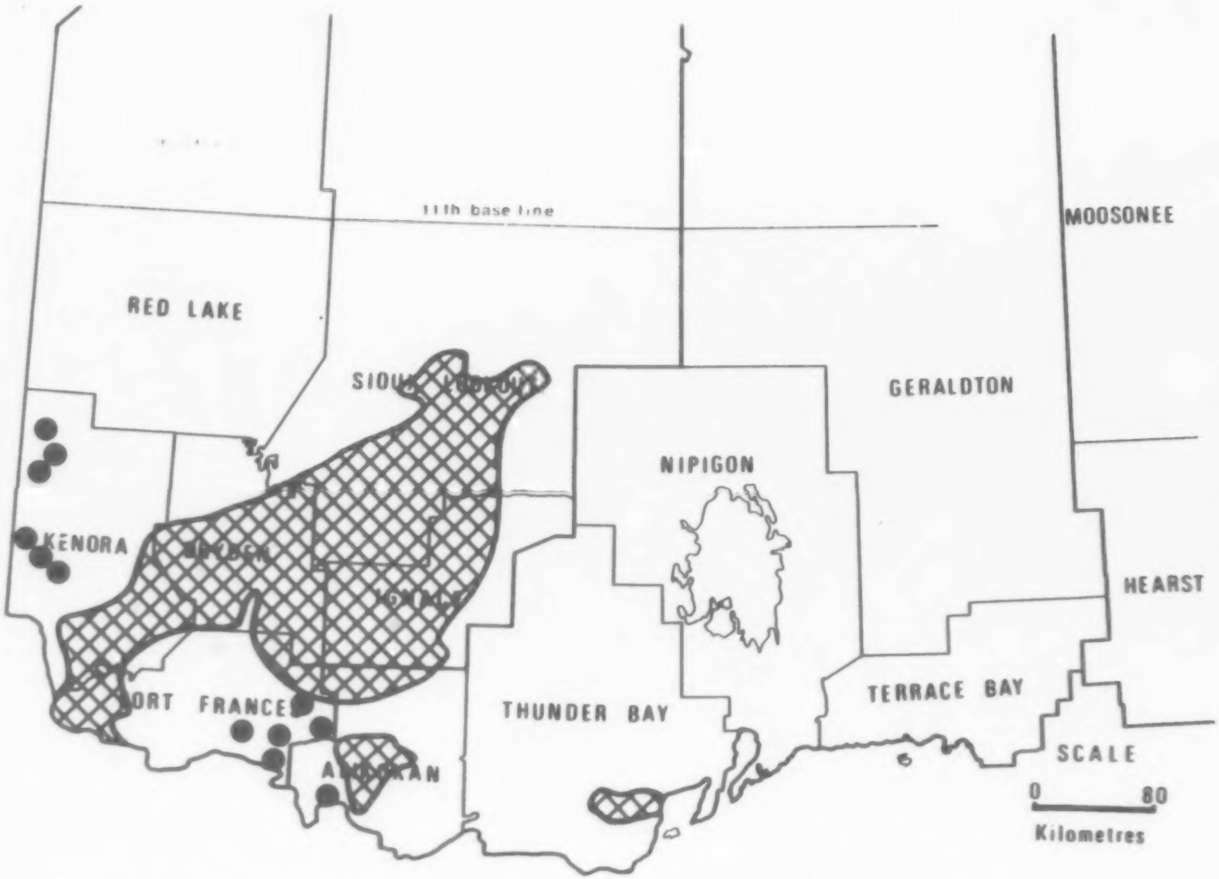
Forest Tent Caterpillar

Areas within which defoliation occurred in 1978

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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GERALDTON
MOOSONEE
NIPIGON
KENORA
HEARST
ORT FRANCES
THUNDER BAY
TERRACE BAY
KAN
SCALE
0
80
Kilometres

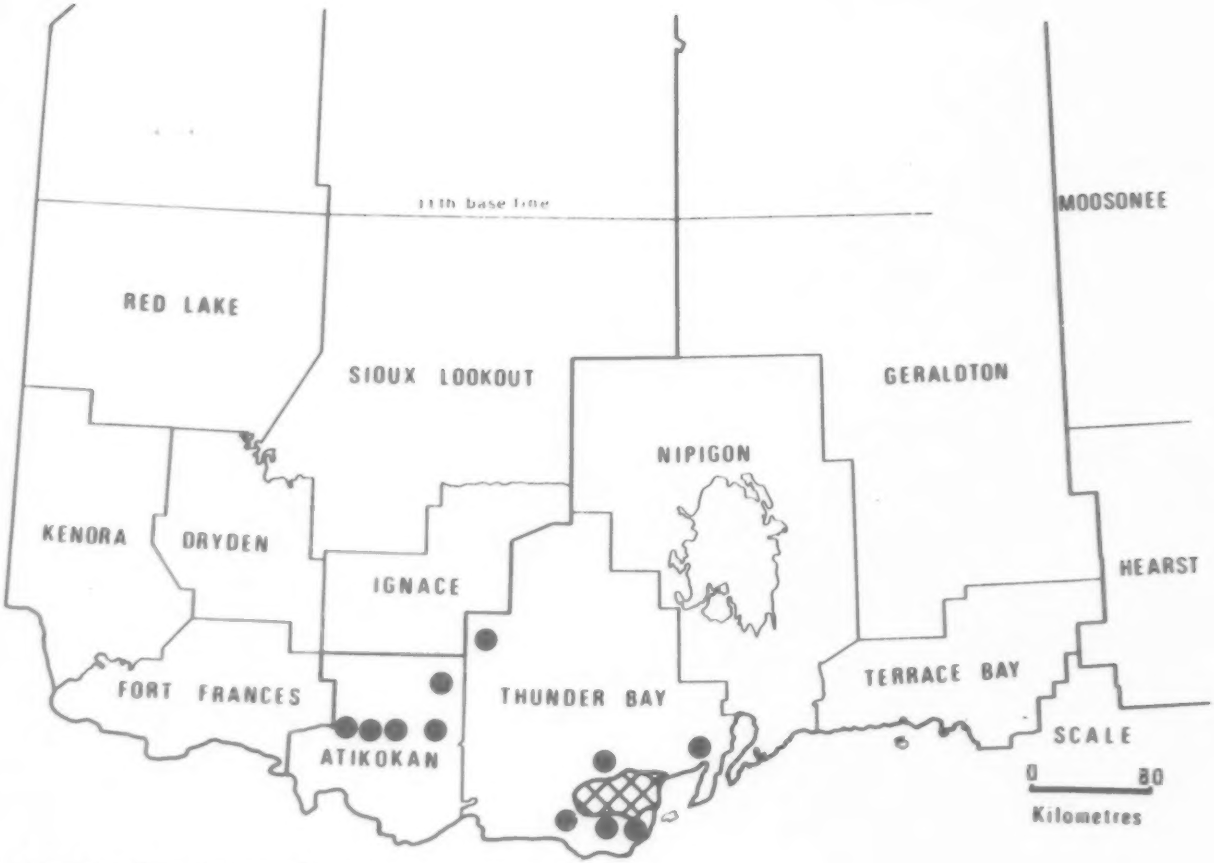
Forest Tent Caterpillar

Areas within which defoliation occurred in 1979

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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HEARST
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IGNACE
TERRACE BAY
FORT FRANCES
THUNDER BAY
ATIKOKAN
SCALE
0
80
Kilometres

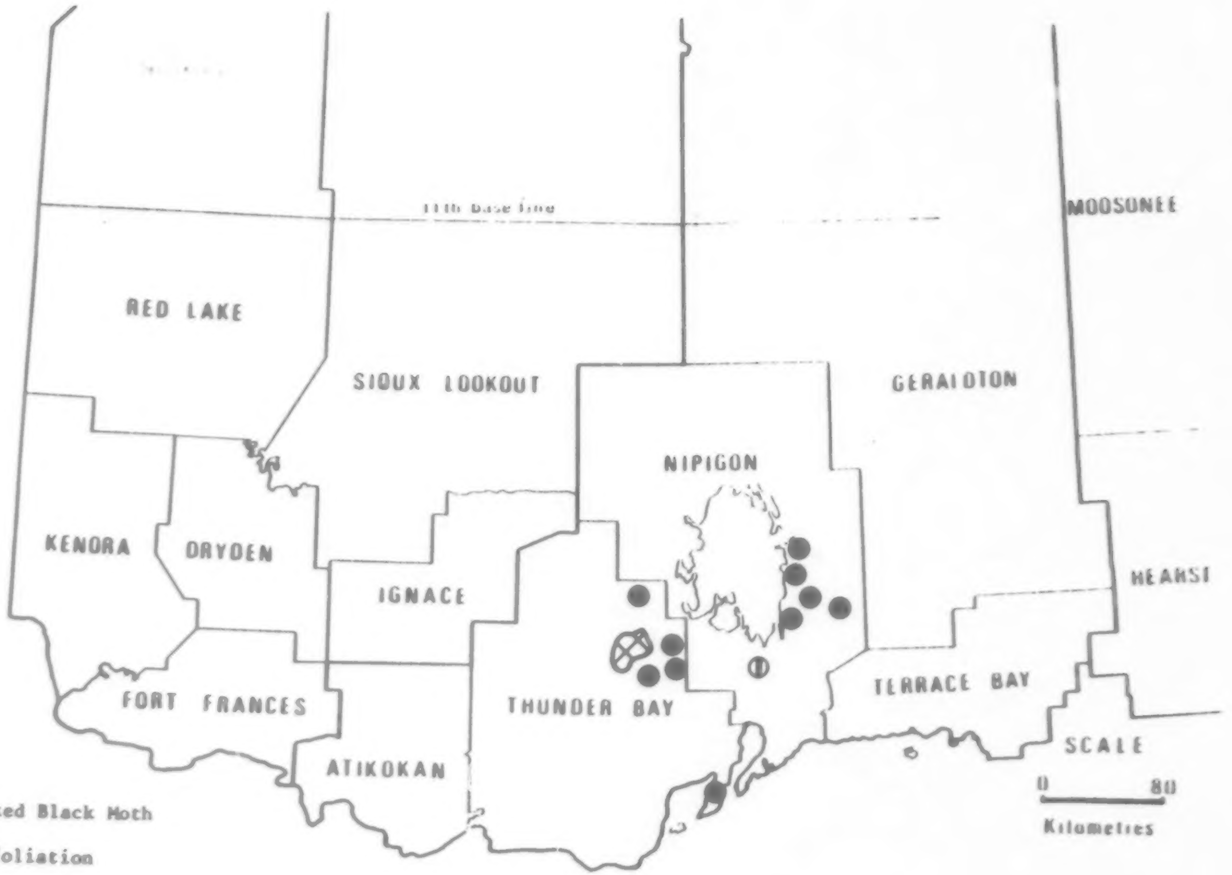
Forest Tent Caterpillar

Areas within which defoliation occurred in 1980

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHWESTERN ONTARIO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NIPIGON
KENORA
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IGNACE
HEARST
THUNDER BAY
TERRACE BAY
FORT FRANCES
ATIKOKAN
SCALE
0
80
Kilometres

Spearmarked Black Moth

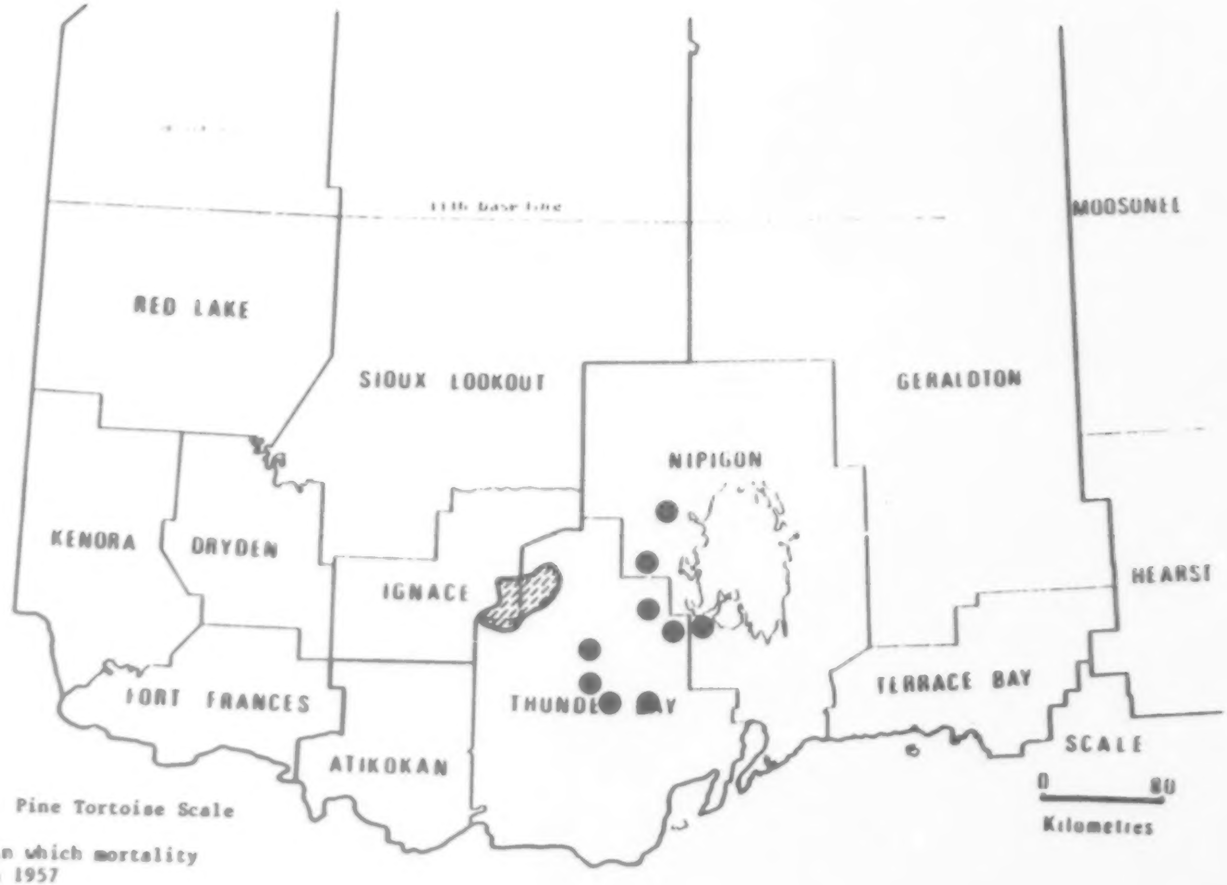
Areas within which defoliation
occurred in 1962

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ● or ▩

NORTHWESTERN ONTARIO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KENORA
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IGNACE
HEARST
THUNDER BAY
TERRACE BAY
FORT FRANCES
ATIKOKAN
SCALE
0
80
Kilometres

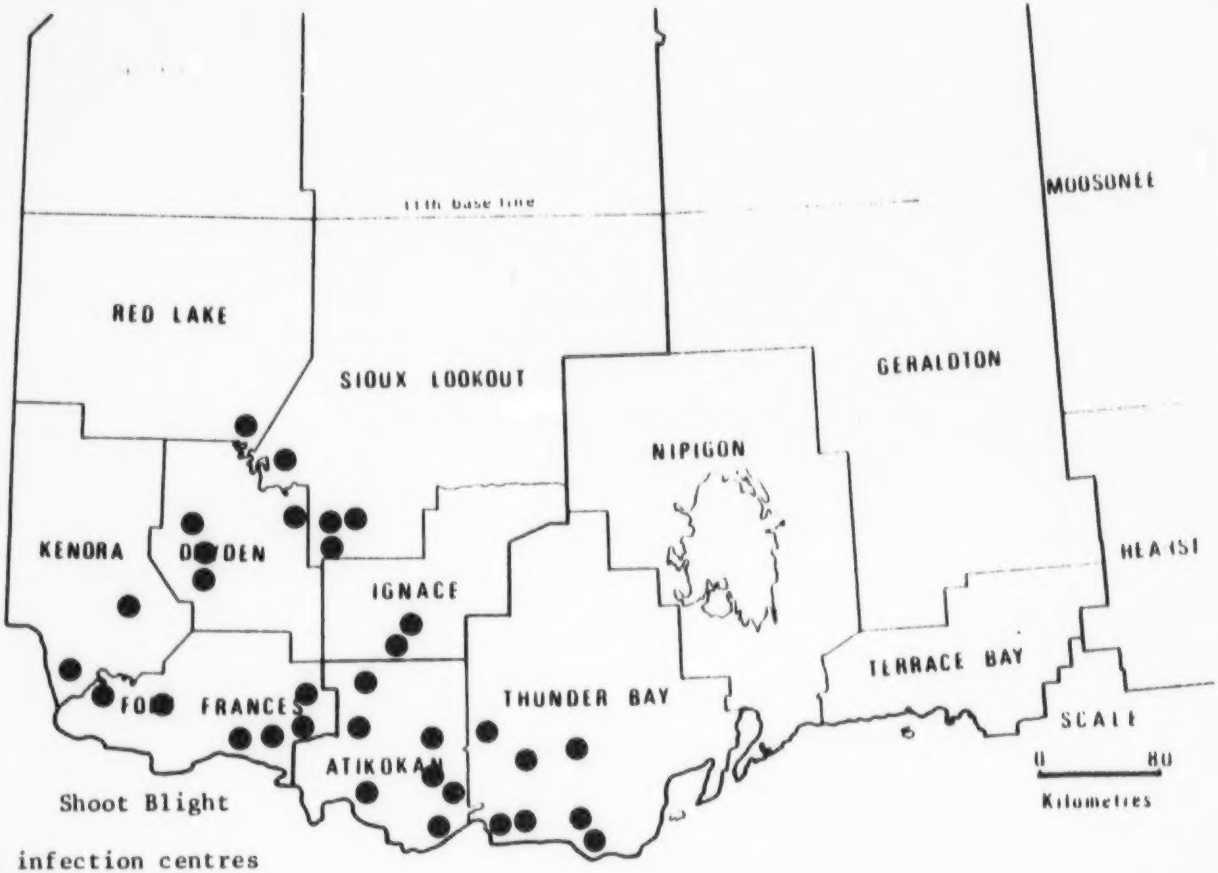
Pine Tortoise Scale

Areas within which mortality occurred in 1957

LEGEND

Mortality ● or ▨

NORTHWESTERN ONTARIO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NIPIGON
KENORA
DRYDEN
HEARST
IGNACE
TERRACE BAY
FORT FRANCES
THUNDER BAY
SCALE
ATIKOKAN
0
80
Kilometres

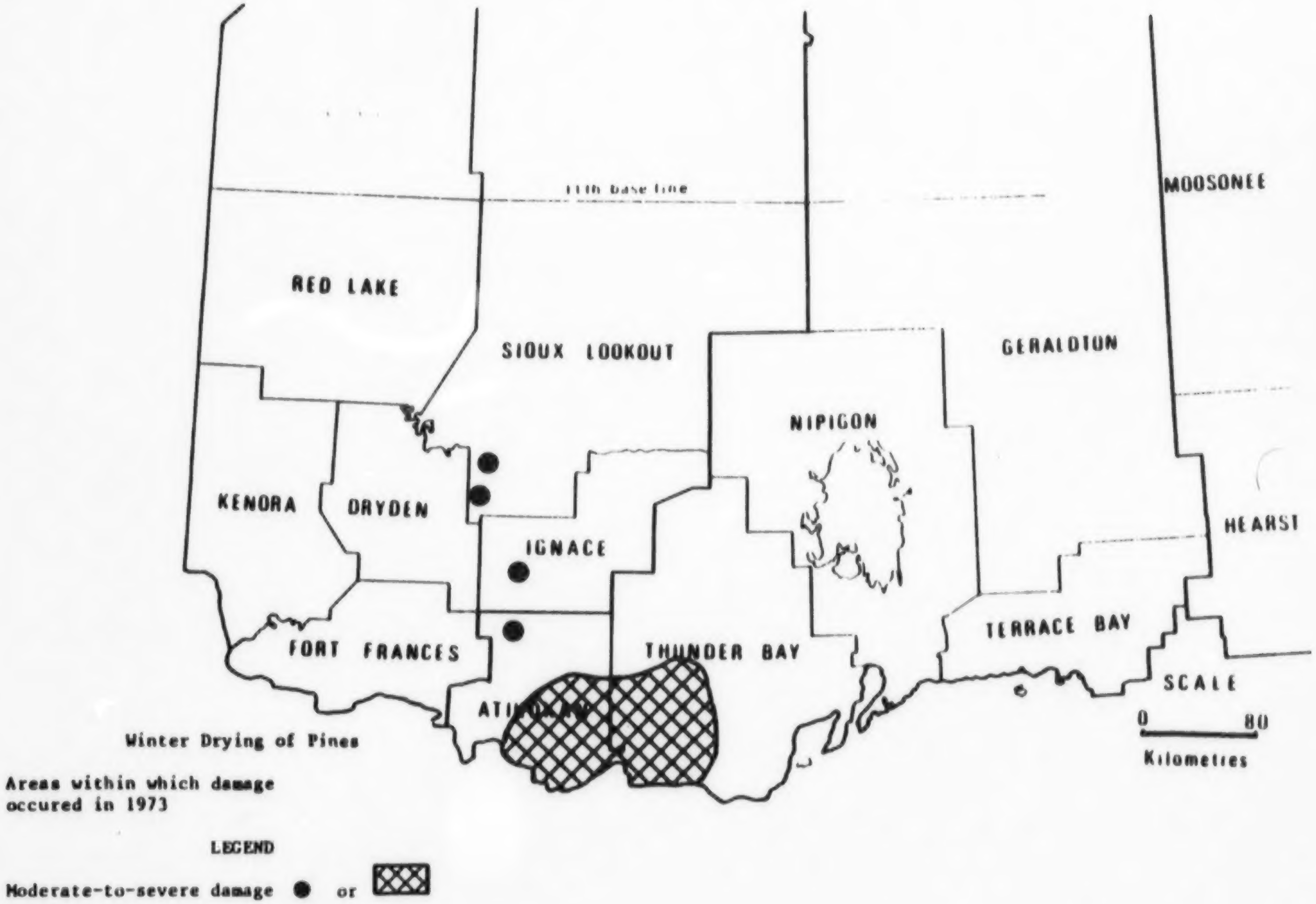
Shoot Blight

Locations of infection centres
in 1973

LEGEND

Infection centres ●

NORTHWESTERN ONTARIO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KENORA
DRYDEN
IGNACE
HEARST
FORT FRANCES
THUNDER BAY
TERRACE BAY
ATIKOKAN
SCALE
0
80
Kilometres

Winter Drying of Pines

Areas within which damage occured in 1973

LEGEND

Moderate-to-severe damage ● or ▨